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A

GUIDE TO THERAPEUTICS

AND

MATERIA MEDICA.

BY

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FOURTH AMERICAN, FROM THE FOURTH ENGLISH, EDITION.

ENLARGED SO AS TO INCLUDE ALL PREPARATIONS OFFICINAL
IN THE U. S. PHARMACOPŒIA,

BY

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1889

AMERICAN EDITOR'S PREFACE

TO

THE FOURTH EDITION.

ALTHOUGH the fourth English edition of this work was practically rewritten and very considerably enlarged, so rapid has been the advance in therapeutics and so great the additions to our materia medica that the American editor has found it necessary to make very many additions so as to make the body of the work include all the remedies and preparations of the last revision of the United States Pharmacopœia; a number of non-officinal but important new drugs are considered, thus making the work as complete in the department of materia medica as it is in therapeutics—a miniature dispensatory in fact. In view of the recent publication of the Formulary of the American Pharmaceutical Association, containing many valuable formulæ that physicians should be familiar with, it has been deemed advisable also to add this, although it has increased the size of the book by nearly sixty pages. The appropriate pharmacopœial definitions have been systematically introduced throughout, giving under each remedy the description and botanical natural order in the case of plants, and

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the chemical formulæ in all other drugs; and new prescriptions have been added to bring the book up to date.

In its present form, which retains all the special features which characterized the work in its former editions, it is believed that it will prove to be even more acceptable than it has been heretofore, and that it will continue to serve a useful purpose as a handy reference book on therapeutics and materia medica to the busy practitioner as well as to the medical student.

F. W.

PHILADELPHIA, May 1, 1889.
No. 218 South Sixteenth Street.

PREFACE

TO

THE FOURTH EDITION.

The preparation of this edition has been made more laborious than usual by the recent appearance of the British Pharmacopœia of 1885, and the very extensive alterations and additions which it contains. It would have been impossible for me to have made adequate reference to these had it not been for the kindness of Dr. Quain, who gave me the opportunity, of which I have freely availed myself, of working through an early copy of the new edition. The principal changes made have been in the direction of leaving out certain substances which have become obsolete, and of adding a large number of others which have obtained a firm hold on professional confidence.

The omissions are seventeen in number, and consist of areca nut, iodide of cadmium and its ointment, castor and its tincture, elm bark and its decoction, digitalin, dulcamara and its infusion, iodide of iron (solid), magnetic oxide and moist peroxide of iron, green iodide of mercury, tobacco enema, solution of atropia, gentian mixture, quinine pill, buckthorn juice and its syrup, acetate of soda and stramonium leaves. I would gladly have seen this list much extended, and made to include a large number of utterly useless articles which still linger on in our text-books, and whose reputation depends on a mysterious and unscientific catalogue of supposed virtues handed down from one generation of authorities to another. I should like to have seen a clean sweep made of these, and must express some disappointment that official sanction has not been given to lightening the pages of our manuals of materia medica and the memory of the overtaxed student of many drugs which no one ever dreams of prescribing; and which, in some instances, probably could not be found if they were wanted. But if the pruning-knife has been used with unnecessary caution, the list of additions is an admirable one, and, containing, as it does, 113 primary articles and their preparations, it includes all the recently introduced drugs which seem to stand on a firm basis and which have already proved useful in practice. Some other alterations have been made, one of which is an attempt to standardize the strength of the preparations of certain active drugs, and another to make the names of the alkaloids terminate in *-ine*.

In conclusion, I have to thank my friend, Mr. CARTEIGHE, President of the Pharmaceutical Society, for many valuable practical suggestions, and to acknowledge the great benefit I have derived from a study of the important works recently published by Drs. LAUDER BRUNTON (a text-book of Pharmacology, Therapeutics and Materia Medica) and MITCHELL BRUCE (Materia Medica and Therapeutics).

R. F.

LONDON,
23 Brook St., Grosvenor Square W.

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ERRATA.

Page 211, line 25, *for* "chloride," *read* "sulphide."

Page 382, after line 7, *insert* the following:—

"OLEUM ERIGERONTIS—OIL OF ERIGERON.

A volatile oil distilled from the fresh flowering herb of Erigeron Canadense, *Linné* (*N. O. Compositæ*).

A pale yellow liquid with slightly pungent taste and characteristic aromatic odor used in *hemorrhage*, especially from the uterus, in doses of gtt. v–xx. It also has diuretic properties, and has been used in the treatment of *gonorrhœa*."

THERAPEUTICS

AND

MATERIA MEDICA.

INTRODUCTION.

Previous to the study of the individual articles comprised within our national Pharmacopœia, the temptation is very strong to launch forth into a disquisition upon the general principles of therapeutics. So many interesting physiological considerations are involved in the actions and uses of drugs, and so many important illustrations might readily be drawn from the wide field of practical medicine, that little apology would really be needed for consuming some of our space in this way. Therapeutics has lately shown a systematic vitality which amply redeems its credit from the old-fashioned accusation of want of progress, for perhaps in no other department of our profession have more solid and satisfactory advances been made. But this very condition of vigor renders far more laborious and responsible the task of attempting to reduce to anything like precision the laws on which we are henceforth to prescribe our drugs, or to draw complete generalizations from the enormous mass of complicated material now at our disposal. Progress occasionally causes temporary confusion, by disturbing old beliefs and furnishing vast legions of sometimes unconfirmed and possibly ill-digested facts; and our present subject is by no means exempt from this almost inevitable tendency of true science.

A careful study of the many exhaustive works on therapeutics published within the last twenty years brings before us a strange medley of experimental evidence, confusing and contradictory it may be at times, but giving most encouraging proofs of the large amount of honest and persevering work now being devoted to the elucidation of this, the most important department of practical medicine. In the following pages we must necessarily assume a dogmatic attitude, and if the extreme precision with which our plan compels us to lay down the actions of drugs offends many whose faith is undeveloped or wavering, we can only excuse ourselves by pleading a conscientious desire to contribute something towards a more scientific scheme of arrangement. Although the time has not yet fully come for a complete explanation of all the therapeutical effects of medicinal agents by their proved physiological properties, we have ventured to take a step in this direction, and must only hope that our very defects and failures may be of use in helping others to develop our principles with greater success.

THE ROUTES BY WHICH MEDICINES ENTER THE CIRCULATION.

1. External Method of Application.—By this we do not mean the merely local action of irritants, caustics, or sedatives, but the attempts which we make to utilize the absorptive function of the cutaneous surface for therapeutic purposes. Now, the *skin* would, at first sight, seem to be a very convenient and tempting arrangement for passing our medicines directly into the blood; but, unfortunately for this purpose, the vascular *cutis vera* is protected by the horny epidermis, which interposes a very considerable barrier to absorption. Much discussion has arisen on this point, and it now seems pretty certain that most drugs cannot permeate the epidermis readily, if at all, and hence this—(*a*) the *epidermic*, as it has been styled, or the method by *inunction*—is not of very wide application, save in the administration of mercury and sometimes belladonna and digitalis. Fats [especially wool-fat or lanoline] and oils, and probably glycerine, increase our chances of procuring absorption in this way [particularly if applied with friction, or "rubbed in"]; alcohol may be of service by dissolving the sebaceous secretion of the skin.

The cuticle, then, being our chief obstacle, it would seem an easy matter to overcome the resistance by its removal, and indeed this, (*b*) the *endermic plan*, as it is called, has done some good service in therapeutics. Having procured a raw surface by blister, we may apply morphine, strychnine, or any drug we may wish to use, directly to the *cutis vera*, and thus obtain an undeniably active effect. But the process is slow and painful, it may be disfiguring, and cannot be very frequently repeated, and it has therefore been, justly, almost entirely superseded by (*c*) the *hypodermic* plan. This, being a rapid, economical, and most efficient proceeding, has come into very general use, the principal drawback being that the pleasant, soothing influence and relief from pain which morphine thus gives our patients have introduced a form of opium-habit, perhaps hardly less obstinately adhered to than the older-fashioned form. Unfortunately, however, not all drugs, nor even all alkaloids, are available for this method of administration, as two conditions are requisite for success—the fluid to be injected must be small in bulk, and it must be unirritating to the parts. Chloral has been thus used, but without much success; quinine, though efficient, is unhappily irritating;[1] ergotine produces hard, discolored, and painful lumps; mercury often causes abscess; and practically we are almost restricted to morphine, atropine, and strychnine, and of these the first named is by far the most available. We may refer to a description of the way in which the little operation is performed, under the subject OPIUM, remembering always that drugs act three or four times more powerfully when given by hypodermic injection than by the mouth.

Some authorities advise us to carry these injections boldly into the substance of the muscles, and it is said that strychnine thus acts well in some forms of paralysis. (*d*) The *parenchymatous method*, as this is called, finds special favor abroad, and we are told that from five to twenty minims of chloroform, thus introduced, deeply into the thigh is a sure cure for sciatica, but the excruciating pain following the operation and the trifling and temporary benefit it produced, have convinced us that the remedy may be even worse than the disease.

Then, again, injections may be made directly into the veins, and this would, theoretically, seem to be the best, because the most straightforward of all methods. We must

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[[1] Several cases have been reported of death from tetanus following the hypodermic injection of quinine.]

not forget, however, that many drugs require to be acted on by some of the digestive juices before their due therapeutic powers are developed, and that the dangers of phlebitis, thrombosis, and of the admission of air into the veins, with all their perilous consequences, cannot be overlooked. (*e*) *Intra-venous injection* is therefore reserved for very desperate cases, and the most notable illustration is in the operation for transfusion, by which, after severe hemorrhage, lives have undoubtedly been saved. The intra-venous injection of chloral, so much praised abroad, has, so far as I know, been hardly practised at home. [It has proved suddenly fatal in several cases.]

2. Internal Administration.—1. Inhalation must stand first, on account of the great facility of its application, of its remarkable efficiency, and the great purity, so to speak, with which drugs thus enter the blood. Anæsthesia produced by chloroform, ether, or laughing-gas will occur, as the leading example, to every mind, and we know that the British Pharmacopœia has recently acknowledged the principle by the admission of six vapors,—creasote, iodine, hydrocyanic acid, chlorine, oil of pinus sylvestris, and conium. But little use, however, has yet been made of this tempting channel for the administration of agents intended to act on the system generally, perhaps partly because it is a matter of doubt as to how far the delicate structures of the air-cells might be tolerant of the prolonged or repeated contact with possibly irritating substances. At present inhalation has been almost confined to the treatment of lung diseases, and ipecacuanha, arsenic, stramonium, tannin, and carbolic acid have been thus employed; but there is no doubt that this plan is capable of much wider development, and that the Germans are far ahead of us in this respect. It is evident, however, that a barrier must always exist to the very extended adoption of aërial medication, by the irritant nature of many medicines, and the impossibility of reducing many of them to that minute subdivision which is essential for either ordinary inhalation or the formation of a readily absorbable spray.

2. Medicinal agents may be injected into any of the open cavities of the body. The rectum is much used in this way, and enemata, clysters, or injections, as they are called, may be divided into three classes.

a. Purgative Enemata.—For efficient and easy evacuation of the large bowel, no method can compare to this, the principal points to remember being that the injection must be ample, from twelve ounces to a pint, must be passed up as far as possible, and must be retained as long as the patient is able. They may be composed of water alone, of salt and water, of gruel or oil, or of any of the purgative enemata contained in the Pharmacopœia Br., their bulk varying from twelve ounces to a pint, and their function is not only to act mechanically by washing out the contents of the lower bowel, but to stimulate its peristaltic movements, which they do very efficiently.

b. Those enemata which are intended for absorption, and which must, therefore, be small in quantity (℥j–ij), so as not to excite the expulsive movements of the gut. The principal of these is the enema opii, so highly prized on account of its restraining influence on the diarrhœa of typhoid and phthisis, and on account of the happy way in which it soothes pain, not only in the rectum, but, by nervous sympathy, also in the neighboring bladder and uterus. Astringents are also occasionally used in this way, whilst asafœtida, ipecacuanha, etc., find their special applications, which will be considered elsewhere, although we may here lay down the general rule, that drugs, with one exception(strychnine), act about half less powerfully by the rectum than by the stomach.

Another mode of utilizing the absorptive power of the bowel is by suppositories, or pastille-shaped masses of medicated oil of theobroma, wax and lard, which are readily introduced within the sphincter ani, and where they readily melt at the temperature of the body.

c. Nutrient enemata are of great service in cases where swallowing is prevented by cancer or stricture of the œsophagus, or where we wish to give the stomach, irritated by the presence of chronic ulcer, a thorough rest. The great difficulty, of course, is that the rectum, although it absorbs readily, has no digestive function, so that we must either compose our enema of very simple materials, or else add pepsin and acid, or pancreatic fluid.

Meat and pancreas enemata, formed of one pound of finely minced beef, free from fat or cellular tissue, with about three ounces of pancreas, kept a patient alive for nine months, and two to six ounces of freshly defibrinated ox-blood twice a day are said to have produced excellent effects in some cases where nourishment could not be taken by the mouth, the combination of a grain or two of chloral preventing premature decomposition. [The same object may be attained by nutrient suppositories with pepsin as proposed by Spencer.]

3. We now come to the most widely used, convenient, and generally available mode of using medicines, by introduction into the stomach. Swallowing a dose at stated intervals involves far less trouble and general annoyance than the other plans we have just passed in review, and, after all, is of almost universal application in ordinary cases. Occasionally, where patients will not or cannot swallow, we require to pump food, or drugs, artificially into the stomach, but, as a general rule, there is no difficulty on that score. It only remains for us now to consider the drawbacks we have to surmount.

First. The patient is made fully aware of the too frequently nauseous taste of his medicine, and we must endeavor to conceal this by flavoring ingredients, by capsules, or other means.

Secondly. Our drugs may spoil the appetite, injure the digestion, lower the tone of the system, cause nausea and depression, and general discomfort, and this we may partly avoid by timing their administration by judicious intervals.

Thirdly. By coming in contact with various secretions, the remedy is much altered before it reaches the blood. The salivary, pancreatic, or biliary fluids, on the one hand, and the gastric juice on the other, must largely neutralize acid and alkaline remedies, whilst some drugs may be rendered partly inert by stomach digestion, or, like curare, may be eliminated too rapidly by the kidney to exert any poisonous influence when taken by the mouth. But we must also remember that these and other actions give us substantial therapeutic aid. The bile facilitates the absorption of our oily remedies, the gastric juice aids the solution and absorption of quinine and other drugs. Many purgatives only act effectually after previous solution in the alkali of the bile, etc.

4. Drugs are occasionally injected into the bladder, but its absorptive power is very limited, if it exist at all, and it is usually only the mucous membrane which is locally attacked in this way by weak acids, alkalies, quinine, opium, and the like.

The drug having now obtained admittance into the blood by any of the channels we have enumerated, proceeds either to exert its physiological action on the healthy processes of life, or to modify in various ways these deviations from normal function which are commonly called disease. It is impossible to reduce to any brief or tabular scheme the infinite varieties and gradations of power possessed by the principal remedies of the Pharmacopœia, nor can we pretend to explain their selective tendencies: why sleep, and purgation, and vomiting, and a wide range of intricate nervous phenomena follow the introduction into the body of this or that substance. All we can do is to note these phenomena with discriminating care, to reduce them, when we can, to scientific principles, and then to consider their practical applications.

GENERAL RULES FOR PRESCRIBING.

Preliminary Considerations.—It will be well, before proceeding further, that we should lay down some broad rules which may guide us in the construction of prescriptions; and it seems best to introduce this subject here, instead of placing it, according to more usual custom, at the end of the book, as it is to be our aim and object to devote much care and attention throughout to the best modes of ordering drugs. Much professional credit may be derived from a good prescription, and as much damage done to the practitioner who orders for his patients mixtures which are neither agreeable to the eye nor palatable to the taste. It is well worthy of the student's attention to consider the most pleasant, effectual, and convenient way of ordering the drugs which are required by the sick, and at first he will no doubt consider this a very difficult task. This will partly depend on the fact that he has had the subject of doses and therapeutical actions presented to him in such concentrated form that he will find some awkwardness in using practically the theoretical knowledge which he has laboriously obtained. The time at his teacher's disposal is so short that he has to run hurriedly from one drug to another, and bring into immediate relation remedies which differ so widely in their effects as to excite some not unnatural confusion in the minds of his hearers. It is therefore not an uncommon thing to hear students say that they do not think they will ever be able to remember the doses of the principal medicines. Then we must remember that, during attendance on out-patient practice, prescribing is either done on very routine principles, or considerations of time and convenience render it advisable to order most drugs according to registered formulæ, which are merely referred to on the patient's notes by name. Thus, although the student may know that dyspepsia may be treated by mist. alk. amara, or debility by mist. quininæ, he would perhaps experience some difficulty in writing a prescription suitable for either case. In the wards, of course, he sees much more prescribing, but is perhaps not very often called upon to do so himself, so that when he settles down on his own account it will be some time before he can handle medicines with that ease, confidence, and certainty which can alone conduce to the comfort of his patients and his own ultimate success. Now it cannot be out of place to urge upon him, here, the great importance of frequently exercising himself in his art. Let him put problems to himself, let him run his eye through his text-books, and endeavor to order the several drugs in varied combination; when he meets with the recommendation to treat a certain disease in a certain way, let him there and then expand these more or less vague directions into the form of a prescription; and so, at last, due blending of ingredients, with the avoidance of incompatibles and the concealment of nauseous properties, will come to him with perfect ease and efficiency.

Another point, the mere mention of which may cause a smile, is the importance of occasionally inspecting, or even tasting, the mixtures we prescribe for our patients. Experiments of this nature will often do more to teach us the efficient combination of drugs than the most profound theoretical knowledge. It is by the experience gained in his own surgery that the country doctor is often found to order far more agreeable prescriptions than the hospital physician, and to steer clear of those hopelessly nasty concoctions which are occasionally sent out from the unwilling hands of druggists in obedience to the orders of scientific authority.

1. Combination of Drugs.—The first things to be considered in writing a prescription are the object for which we order this certain combination of drugs, which symptoms in our patient's case do we wish to alter or modify, what is to be our principal ingredient, and in what quantity. These being duly settled in our minds, we reflect whether it is better to give this particular article by itself, or to combine it with other substances which may possibly assist or mitigate its action, or may at all events conceal its more or less nauseous taste. Now it is a very commonly given recommendation that in our prescriptions we should aim at simplicity as much as possible, and this certainly holds good within certain limits. The old-fashioned custom used to be to string together a long list of ill-understood substances, in the hope that some one or other of them might hit the right nail on the head, and even now traces of this polypharmacy linger about medical practice. When, however, we are tolerably certain of the action of our drug, and more especially when we are making scientific observations on its mode of action, it is often of great importance that we should not obscure its effects by the addition of any other active substances, but order it either simply in distilled water, or merely combined with other ingredients for flavoring purposes. But we must remember not to carry this principle too far. No fact is more thoroughly proved in therapeutics than the value, under certain conditions, of due combination, and the way in which one drug may assist the action of another.

Thus, taking the case of diuretics, we know well that a prescription containing three or four members of this group will often act where one produces little or no effect, and that mercury is of undoubted service in assisting the influence of squill and digitalis over the urinary secretion. Cough medicines are always best given in combination with a variety of drugs, and the same holds good of purgatives; for we all know how hyoscyamus or belladonna will both aid and hold in check the action of colocynth, how a little sulphuric acid and iron will promote that of sulphate of magnesia, how jalap aids the peristaltic intestinal contractions to remove the watery fluid which cream of tartar drains into the bowels.

Moreover, we all gladly acknowledge the advantage to be derived by the addition of a little iron to the digitalis which we give as a cardiac tonic, and to the ergot which is to stimulate the uterine functions, knowing, as we do, the important rôle which an improved blood supply necessarily plays under these circumstances. Narcotics also often gain in potency by combination, for do we not know that bromide of potassium and chloral together will occasionally cause sleep where either separately would have failed? Aromatics are often of great service in counteracting the griping tendencies of certain active purgatives, and the success which has been claimed in some special conditions for Warburg's tincture over quinine, is held to be due to the peculiar way in which the action of the active ingredient is reinforced by the somewhat complicated farrago of substances by which it is surrounded.

Arsenic is believed by some to prevent the unsightly acne produced by bromide of potassium; and the best mode of obviating the discomfort of cinchonism consists in adding a little hydrobromic acid to our quinine. [The combination of a small amount of opium or morphine or quinine has been also found to prevent the occurrence of the disagreeable nervous symptoms that sometimes occur, and at the same time it increases the antiperiodic power of the drug, so that smaller doses may produce equal therapeutic effect.]

Several alkaline medicines, given together, seem to act better in rheumatic fever than the simple administration of one member of the group. Tonics, such as quinine and iron, are blended with advantage. Then again, we add one drug to another for the purpose of counteracting some unpleasant physiological effect; thus spiritus ammoniæ aromaticus mitigates the unpleasant symptom of iodism, and atropine lessens the chances of discomfort which attend the subcutaneous injection of morphine, and hydrobromic acid lessens the deafness and ringing in the ears which are sometimes caused by quinine. Instances like this might be multiplied almost *ad infinitum;* but we shall develop the subject further as we go on, and refer frequently to the laws which should guide us in considering whether the various drugs are best ordered singly or in combination.

2. Form of Administration.—We must take into consideration whether we ought to administer our drug in a concentrated or diluted form, and here again we shall find it necessary to act very differently under different circumstances. As a general rule, we may lay down that the metals are best given either in pill or in a small quantity of fluid, and this remark applies more especially to those which have very active physiological properties. Thus we generally give arsenic and perchloride of mercury [corrosive sublimate] in a state of only moderate dilution. Salts, on the other hand, and more especially the purgative salts, act best when taken in large quantities of fluid, and we shall find in practice that iodide of potassium is decidedly more efficacious when freely diluted, that sulphate of magnesium follows the same rule, and that in the case of diuretics also we may aid their action by combining the directly flooding or mechanically sluicing effect on the kidney of large quantities of watery fluid.

3. Period for Exhibition.—The period of administration is also well deserving of careful study, and we may indicate one or two useful rules with regard to the action of alkalies and acids. As acids check acid secretions, and alkalies have a similar influence over those with alkaline reaction and *vice versâ*, we can readily understand the effect which they may exercise over digestion. Thus an acid given directly before a meal must interfere with the due assimilation of the nitrogenous articles of diet by checking the supplies of gastric juice, whereas an alkali given at the same time must theoretically produce the best results by stimulating that secretion. If, on the other hand, we give an alkaline medicine after food, we do harm by directly neutralizing the acid on which some part at least of the active principle of the gastric juice depends.[1]

Drugs which have a distinctly lowering or irritating effect on the system are best given with or after meals, so as to prevent these results as far as possible; thus we always give arsenic or corrosive sublimate or strychnine at these times, and find that they are well borne by persons who could not take them on an empty stomach. For a different reason, again, we generally find it convenient to prescribe cod-liver oil after food, not only because it is less likely to cause sickness when given at that time, but also because oily matters being absorbed by the lacteals are most readily taken up when these structures are in full working order, and when they can be acted upon by the biliary and pancreatic secretions.

Again, when we wish to imitate or excite a normal physiological action, we must time our drug accordingly. Opium, or any other narcotic, is much more likely to produce sleep when taken at night than at other times, and a mild purga-

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[[1] An important lesson for the student to learn at the outset is, not to place too great reliance upon his own *a priori* reasoning concerning the therapeutical effects of remedies. Drugs in many instances have more than one action upon the economy: for instance, the antiseptic influence of hydrochloric acid may be more efficient in gastric disorders than its simple acid reaction; or the astringent effect of aromatic sulphuric acid may be especially serviceable. This therapeutic feature is entirely distinct from the varying effect produced by altering the size of the dose, which is considered further on.]

tive in the morning will often stimulate the peristaltic movement of the intestines to evacuate the bowels at the time when they are accustomed to act. Again, when we wish to re-excite a suspended menstrual flow, we will find our best chances of success in directing our remedies more especially about the time at which the monthly period ought naturally to appear.

The efficacy of purgatives is also markedly aided by a due consideration of the periods at which they ought to be given. A resinoid cathartic principle contained in pill is usually of slow and deliberate action, and may be given indifferently with meals—as in the case of dinner pills—or on an empty stomach before bed-time; but saline purgatives generally act best when given fasting, as the veins of the intestinal tract are then less full and more predisposed to rapid absorption. As an illustration of this we need only refer to the much more potent effect of an ordinary seidlitz powder given before than after breakfast.

Anthelmintics, again, are always best given after as long a fast as possible, so that the parasites which they attack may not be shielded by food or mucus, and we find in practice that early morning is the most convenient period for their administration.

4. Dosage.—The relative efficiency of large and small doses is the next point which has to be taken into consideration; and here we are at once confronted by some of the most delicate and difficult questions in therapeutics—delicate because they border closely on the dangerous ground of homœopathy; difficult on account of their often unsettled nature. We cannot pretend to give any exhaustive discussion to this branch of our subject, because the materials for it are not forthcoming, but we can all contribute somewhat to its solution by experimental trials of various drugs given in these different ways. This much, however, we do know, that in many cases we get far more satisfactory results in special emergencies, or temporary conditions, by giving one tolerably large dose at one time; and especially is this the case with narcotics, small quantities of which only excite and annoy, whilst a full dose satisfactorily brings about the desired result of sleep. Purgatives and emetics, again, are also best given in one considerable dose; tonics, astringents, and diuretics require to be steadily repeated at certain short and regular intervals in order to have a sustained and continued effect. But the true point at which we wish to arrive is this: Can we best obtain rapidly and efficiently the constitutional action of a drug such as belladonna, or aconite, by administering in average quantities two or three times a day, or by ordering it to be taken in very small doses often repeated? Now, supposing we are called upon to treat a case of acute tonsillitis or catarrhal febrile disturbance, which we wish to remove as rapidly as possible, and we elect aconite as the special remedy to be used, the most reliable method for its administration is in drop or even half-drop doses every hour, half hour, or even ten minutes. General experience has pretty well confirmed this teaching, and has extended it to other medicines, such as prussic acid, which will thus more effectually control urgent sickness than when given at longer intervals in the more canonical way; to tartar emetic, which, in very small and often-repeated quantities, exercises a remarkable effect over infantile bronchitis; to ipecacuanha, which in minim doses will frequently check obstinate vomiting; to calomel and gray powder, which in minute doses, every half hour, will often stop irritability of the stomach when nothing else will succeed. Instances of this sort will be multiplied as our consideration of the individual articles of the Pharmacopœia goes on, the principle being steadily kept in mind that we may often bring the system much more efficiently under the special influence of a drug, by ordering it in small quantity often repeated, than by giving full doses two or three times a day; and this necessarily applies with special force to those drugs which are rapidly thrown out of the system, and whose action upon the structure or function they are particularly supposed to effect, is thus kept up and, so to speak, perpetuated, by very frequent administration.

On the other hand, we must not forget that certain medicines must be given in very large quantities before their physiological properties are obtained. Thus it would be useless to expect succus conii to tranquillize irregular muscular movement in less doses than f℥j; [the succus conii has been dropped from the U. S. P. because its strength is variable.] Frequently we are required to give even more than this: belladonna is of no use in nocturnal incontinence of urine unless boldly pushed up to fʒj or fʒjss of the tincture. [In this connection it should be borne in mind that the British tincture of belladonna is only one-half the strength of that of the U. S. Pharmacopœia.] Arsenic acts best in chorea when prescribed with no timid hand.

Another point of interest in connection with this inquiry is, that drugs often display different and even opposing actions, according as they are given in large or small doses.

Thus we have seen that drop doses of wine of ipecac will often check vomiting, whereas it is well known that a teaspoonful, or even less, will almost immediately evacuate the stomach. Sulphate of zinc, in twenty or thirty grain doses, is prized as our best emetic, while it is equally established that from one to ten grains is a valuable nervine tonic, much used by some physicians in the treatment of chorea. [Quinine in doses of from two to five grains is a tonic; from six to ten grains, a stimulant; and in large doses is an anti-periodic and anti-pyretic.] Small doses of opium excite, whilst large soothe into sleep; half-ounce doses of infusion of digitalis may be more safely given than those of f℥j too frequently repeated; the neutral salts of potash and soda are, as a rule, purgative in large, diuretic in small, doses; and other instances of this principle—which will afterwards be given—must be borne in the mind of the prescriber before he can pretend to make most efficient use of the weapons at his disposal.

5. The Interval between Doses.—The next heading to which reference is usually made is regarding how often we ought to repeat our dose of medicine; but this is so far involved in what has gone before, that very little remains to be said. The ordinary rule is to order our mixture to be taken three times a day, or every four hours, unless special circumstances, such as we have already indicated, render it advisable to repeat more frequently. Although many sick persons look forward to the time of taking their physic, and feel moral as well as physical support from the mere act of attending to their doctor's order, the greater proportion are not so favorably impressed, and would willingly be relieved from the necessity of swallowing the often nauseous compounds they receive. Homœopathists, no doubt, derive much of their success from the tasteless nature of their medicines, and we have not yet devoted sufficient attention to the elegances and refinements of pharmacy. It is well, therefore, to direct our tonics and astringents, and drugs whose action is to be spread over some considerable time, to be taken three times a day, always bearing in mind those important exceptions which recent investigation has done such good service in impressing upon our attention.

6. Individual Peculiarities; Idiosyncrasy; Habit.—When the student has been fairly emancipated from the leading-strings of his teachers, and enters practice on his own account, he will often be disappointed at the way in which drugs play their allotted parts. The necessarily cut-and-dried and dogmatic descriptions of the text-books have led him to believe that such and such a medicine will always act in a particular way, and he accordingly prescribes it with full confidence in a given case. But not only may the proper effects fail of development, but very unpleasant and almost unlooked-for symptoms may follow its use, which will be productive of much discomfort and uncertainty, and may even tend to shake his professional credit. The influence of that strange individual peculiarity, usually termed "idiosyncrasy," and of which no reasonable explanation has ever been given, must be very carefully taken into account in prescribing, and we shall refer to it on all suitable occasions. Sometimes it renders our patient unduly susceptible to the action of drugs, and thus we may find one person seriously salivated by one grain of calomel, another who dare not touch quinine, a third who is furiously excited by opium, whilst a fourth may be poisoned by a single grain of morphine. Phosphorus and bromide of potassium also occasionally cause their peculiar effects in very small doses. A good precaution, therefore, is, before prescribing any of these drugs, to ascertain from the patient whether he has ever taken any of them before, and whether uncomfortable effects could be in any way attributable to their use. But, on the other hand, our patient's constitution may be such that very large quantities of drugs will alone succeed in acting; and remarkable stories are told by Christison and others of the immense quantities of opium which persons, quite unaccustomed to its use, have been occasionally able to take with impunity. Purgatives act very differently on different people; and some require immense quantities of anæsthetic vapor before full insensibility is obtained. Although, as I have just said, we may often anticipate uncomfortable effects by due preliminary inquiry, it too often happens that they come on suddenly, and quite unexpectedly. Idiosyncrasy is so wide-spread and deep-rooted in the human constitution, in almost every function and action, that we can hardly hope ever to obtain the key to its mysteries. Why, may be asked, do particular articles of diet disagree with special persons? Why does one person, on exposure to cold, take a simple catarrh, whilst a second becomes a prey to rheumatic fever, and a third escapes unharmed? Why do we all differ from one another in some minor degree in almost everything that we do? Until we can clear up these problems, it is vain for us to attempt to explain why we require to adapt our doses so carefully to individual constitution and peculiarity; and the reason why the student is at first perplexed by all this is that we meet with these differences much more frequently in the upper ranks of society. The hospital or dispensary patient swallows any dose, however nauseous, with much satisfaction, and is much less often affected by those troubles of irregular physiological action which so frequently harass the family medical attendant in more aristocratic circles.

The power therefore, and a power unfortunately too often uncommunicable to others, of appreciating the peculiarities of different persons in respect of their "behavior" towards drugs, is just one of those "knacks" which go far to make up success in practice. We ourselves often wonder, or share the surprise of others, why certain doctors, whose scientific attainments may be none of the highest, attract and retain in a remarkable way the confidence of their patients; and we may be sure that something beyond mere luck, or manner, or accident, is the true secret of their superiority. Tact in the use of remedies is no doubt in some degree the lever which has raised them to their positions, and more especially the power which well-remembered experience has conferred upon them of knowing intuitively, as we sometimes call it, what drugs will best agree with the individual sufferer. We yet know nothing of idiosyncrasy beyond the uncomfortable fact of its frequent and unsuspected existence, and, in proportion to our ignorance, all the more keen and persevering should be our search after those laws which must inevitably regulate its action. This it is which makes, and in the present state of our knowledge always must make, the deduction from experiment on animals so often fallacious when applied to the human subject. I am far from wishing to undervalue the benefits conferred on our science by experiment, but we must remember that brutes have their idiosyncrasies as well as ourselves, and, until both are thoroughly understood, therapeutics will lack much of the precision which it must eventually attain. And for the further elucidation of our own eccentricities in this way we must mainly trust to the labors of family doctors, and it is to be hoped that the Collective Investigation Department of the British Medical Association, which is now doing such good work, will eventually aim their attention to therapeutical problems and obtain from general practitioners some record of the experience gained by them in their wide field of observation.

The influence of habit on therapeutics is also worthy of every consideration, for we shall find in practice that medicines often lose their effect when continued for any lengthened period. More especially is this the case with opiates and narcotics generally, the dose of which requires to be gradually increased from time to time. Arsenic has the same peculiarity, as is shown in the case of the arsenic-eaters of Styria, who, by long continuance in the use of that substance, are at last able to consume quantities which would inevitably prove fatal to a novice. And this leads to the question of *toleration*, an old-fashioned term dating from the days of heavy dosing with irritating metallic substances, but having sufficient bearing on modern practice to justify its consideration here. We have said that the term toleration savors somewhat of antiquity, because the great illustration of this principle used to be afforded by tartar emetic, which was then much more freely used in acute inflammations than now; and when I say antiquity I do not refer to anything more remote than perhaps half a century ago. Then the contra-stimulant treatment of pneumonia was in full swing, and the curious fact became gradually known that, although the first doses of tartar emetic often caused much nausea and depression, subsequently larger quantities were well borne; and this was explained by what was called toleration of the drug being established in the system. It will be seen, when we come to consider in detail the actions and uses of tartar emetic, that a very sufficient and scientific explanation can be given of this somewhat mysterious effect. In these days, inflammatory action is treated on somewhat different principles, and antimony is comparatively little used; but the principle of toleration can be recognized in the use of other drugs. Thus, in dysentery, quantities of ipecacuanha are given which would infallibly produce violent vomiting in a healthy subject; arsenic is better borne in skin disease than in a state of health; choreic patients are able to swallow almost emetic doses of zinc sulphate without the action of vomiting being induced. Digitalis is well known to be given freely in delirium tremens, and there is little doubt that the experiment of prescribing half an ounce of the tincture to a person in ordinary health would be productive of serious if not fatal consequences. Further instances of toleration might readily be adduced, but it will be much more to the advantage of the student to recommend him to pick out other examples for himself than to provide him with a cut-and-dried list of all that is known on the subject.

7. Accumulation.—We next come to what is commonly known as *accumulation*, the theory of which is that certain drugs rest or become stored up in the system until they reach a dangerous quantity, when inconvenient or poisonous symptoms may result. Thus we know that after a certain continuance in the use of digitalis, faintness and depression have often been observed, that strychnine may cause uncomfortable twitchings after it has been taken for some time, that bromide of potassium only begins to cause annoyance when the system seems to have become saturated with the salt. Does this really mean that these substances have reached the point beyond which their poisonous action is neutralized, so to speak, by the symptoms which their therapeutical powers attack, or is the defect in the organs of elimination which fail to expel them efficiently from the system? It is probable that both these and the numerous other examples which our subsequent pages will contain depend on both these causes in some degree, in addition to another, and that is that the organ or tissue towards which the physiological action of the drug is directed is, after long-continued stimulation by repeated small doses, worked up into a certain condition of special excitement or depression, and discharges accordingly. Thus we find the twitchings from strychnine, the cardiac depression of digitalis, the nervous weakness and ataxy from bromide of potassium, the paralysis resulting from alcohol. The metals, as mercury, arsenic, etc., on the other hand, no doubt act by being stored up within the tissues, being brought into excessive action by some defect of elimination.

And the practical outcome is, that in prescribing many of these drugs, and more especially digitalis, strychnine, and bromide of potassium, it is well to have an occasional break, to omit our prescription for a day or two, so as to give the parts a rest, and enable the remedy to act afterwards with better effect perhaps in even diminished dose. It may happen that some of these uncomfortable effects are caused by defects in the organ of elimination, and it is therefore very important, when prescribing certain drugs, and more especially salicylic acid, to satisfy ourselves, by careful examination of the urine, that the kidneys are in thorough good working order.

8. Chemical and Physiological Incompatibilities.—And now we come to the doctrine of incompatibility, which is of all-essential importance in therapeutics, consisting as it does of the principles which we require to know in order to avoid that amount of clashing of the different ingredients of our prescription which may either alter or destroy their action. Now incompatibility may be of different sorts, and is generally divided into chemical and physiological. Of these we will first consider chemical incompatibility.

This consists in the chemical action of one drug on another, which may result in the formation of a new compound when they are mixed. Thus the addition of iron to decoction of cinchona will produce an unsightly, black mixture; strychnine and perchloride of mercury will not go with gelatine; sulphuric acid and lead form an insoluble sulphate. A good deal of this incompatibility, however, is inconvenient, principally, because the resulting solution is often thick, turbid, and unsightly, and therefore repugnant to the patient. Many most incompatible mixtures are therapeutically efficient, and some are even prescribed deliberately. Quite otherwise is it, however, with the second group, or the physiological incompatibles, the *rationale* of which is that the action of one drug is so far antagonistic to that of another that the mixture of the two is necessarily inert. Thus the combination of belladonna and opium is in some degree opposed, so is atropine and prussic acid, aconite, and digitalis, strychnine and Calabar bean, and most markedly of all, caustic alkalies with belladonna, hyoscyamus, stramonium, or tobacco, all of whose active principles are thus absolutely destroyed.

But, as already hinted, we often prescribe an incompatible mixture for the purpose of actually deriving therapeutic advantage from the resulting compound. Thus what is a more generally used and, I may confidently say, more useful prescription than bichloride of mercury and iodide of potassium, making an iodide of mercury, which is much more efficacious than that salt itself as prepared by more elaborate chemical agency?[1] Again, the far-famed mist. ferri co. derives much of its charm from the freshly prepared carbonate of iron which results from the due combination of ferric sulphate and pottassium carbonate. Black wash is another example; and although corrosive sublimate and decoction of bark are undoubtedly incompatible, no better means is known of counteracting the depressing effects of this preparation of mercury.

[Some of the principles of incompatibility, as applied to the writing of prescriptions, may be conveniently formulated as follows:—

General Principles of the Incompatibility of drugs.—1. As a rule a drug is incompatible with its *antidotes* and its *chemical tests*, especially if the latter depend upon the forming of an insoluble precipitate; thus metallic salts or albumen should not be prescribed with substances containing tannin, nor chlorides with nitrate of silver. Therefore, in combining soluble salts with each other, or with infusions, be careful to see that an insoluble precipitate is not unintentionally formed.

2. The alkaloids are precipitated by tannic acid and caustic alkalies, and may be destroyed by chlorinous compounds.

3. The alkalies, as a rule, precipitate metallic salts, and if caustic, may render vegetable active principles inert.

4. Mineral acids decompose salts of vegetable acids, and other salts where they have a superior affinity. They form ethers with alcoholic preparations.

5. The glucosides, such as salicin, santonin, and colocynth, are decomposed by free acids, or emulsin.

6. Tinctures in general deposit resin on adding water, which also precipitates iodine from its alcoholic solution. Infusions containing tannic acid are incompatible with metallic salts generally.

Special Incompatibles.—In accordance with the first rule

[[1] It is true that these salts in solution are chemically incompatible, as a reaction takes place, and a precipitate is formed. This precipitate, however, is soluble in an excess of potassium iodide, forming a new chemical compound, which may be looked upon as an iodo-hydrargyrate of potassium, dissolved in a solution of potassium chloride, with perhaps other compounds not positively determined.]

given above, the table of antidotes placed at the end of the book will for the most part suggest the individual incompatibilities.

The following should as the rule be exhibited alone, or simply dissolve in distilled water : corrosive sublimate, tannic acid, strychnine, preparations of lead and of iodine, and nitrate of silver. With glucosides, or creasote, silver nitrate forms an explosive compound, and it should never be prescribed in pill with vegetable extracts.

A mixture of chromic acid and alcohol is explosive, and so is chlorate of potassium, when powdered with sulphur or tannic acid.

Aromatic waters sometimes precipitate metallic salts, on account of containing a small amount of carbonate of magnesium.

Syrup of squill and of garlic contain free acetic acid, and are incompatible with carbonates.

Tincture of chloride of iron precipitates quinine from the solution of quinine sulphate, but to some extent redissolves it when in large excess.

Solution of acacia gelatinizes with tincture of the chloride of iron and with borax. It is precipitated by a solution of subacetate of lead, and by alcohol.]

9. Prescribing for Children.—A few words may now be said on the art of prescribing for children, a subject which is only incidentally touched upon in our ordinary books, and is then treated in a somewhat misleading manner. Elaborate tables have, however, been drawn up for the regulation of doses according to age, and in all of these it is assumed that young children necessarily require much smaller doses of most drugs than adults; and this is true in so far that it is seldom advisable to deal out our mixtures to them in the time-honored tablespoonful or two tablespoonfuls of their elders. But the important fact which these systems invariably ignore is this, that children can often take, not only with impunity, but even with decided benefit, quantities of some active remedies which will correspond to the full adult dose. And the reason of this may be looked for in the much greater destruction and construction of tissue in early life, whereby the organs of elimination are in unusual activity, and hence disposed to excrete medicinal substances with special promptitude. Whether we accept this explanation or not, however, we may warn the young practitioner that an adherence to the rules usually laid down for children's prescriptions will cause him serious disappointment, and that he will be surprised at the beneficial results which will often follow the adoption of a bolder course.

To furnish a few examples of this proposition, we will begin with belladonna, which may be used very freely in childhood, and the dose of which we have pushed, in a child of ten years of age suffering from incontinence of urine, to fʒij (Ph. B.),[1] with good effect, and the development of only very mild forms of physiological disturbance. We commonly begin with ♏xx in a child of two or three, and have prescribed ♏x in an infant of six months with remarkable benefit; and the result of my experience undoubtedly is, that children bear belladonna actually better than grown-up persons, and that in them really poisonous symptoms rarely if ever occur.

Arsenic may also be freely given to children, and, at the age of five or six, I should have no hesitation in beginning with ♏v [of Fowler's solution] and pushing even up to ♏x if necessary. Strychnine is also well borne. Tinct. ferri chloridi may be taken in large quantities, and I have seen excellent results follow the administration of fʒj ter die, in a little girl of six years.

Children will often require large purgative doses, more especially of pulv. jalap. co., and of ipecacuanha as an emetic. I have often ordered quantities which have startled the dispenser, and induced him to come for explanation under the idea that I had made a mistake. Bromide of potassium may also be freely given, and other instances will be noted as we go on. We should always remember the sound old advice to be very careful with opium at an early period of life. Every practitioner has no doubt seen cases in which ill results have unexpectedly followed laudanum prescribed before the age of one year, and I cannot do more than reiterate the warnings on this subject which every manual of materia medica most properly contains. The explanation of this possibly enough may be, that the open fontanelles of early childhood permit a much more sudden and effective increase in the quantity of blood contained within the skull than in adult life. Some confirmation of such an opinion may be found in

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[[1] The tincture of belladonna of the British Pharmacopœia is about one-half the strength of that of the U. S. P.]

the fact that very young infants will usually bear large doses of those narcotics which act by causing anæmia of the brain, and notably of chloral hydrate, which I have prescribed with benefit in five-grain doses thrice a day to a little child only twelve months old. It is important to remember that below the age of one year bromide of potassium is ill-borne by children having a tendency to cause a pustular rash, and it is also well to be cautious in using iodide of potassium at this early age.

It is always well to make our dose as small as possible, one or two teaspoonfuls being usually sufficient, and great pains must be taken, by means of well-adjusted flavoring ingredients, to disguise the too often nauseous taste of our drugs. Various syrups and aromatic waters here stand us in good stead, and it is well if possible, when dealing with very young infants, so to reduce the bulk of the medicine as to enable it to be mixed unobserved with milk, veal-broth, beef-tea, or some sort of confection. In this there is nothing really antagonistic to the principle which has just been developed, as we can readily enough give considerable quantities of belladonna, arsenic, etc., in comparatively small quantities of water, or even in none at all.

Children are, however, somewhat strangely capricious in their taste; for whilst they object decidedly to bitter or acid substances, they will take oils readily, and generally seem to derive satisfaction from sucking in cod-liver oil. Nauseous powders which would seem inexpressibly revolting to their elders, they often take well, and by a little contriving and consideration we can generally manage to persuade them to consume their dose with philosophic composure, if not with actual relish.

We may now briefly consider two very interesting points:—

First, the effects of drugs administered to a nursing mother on the child. Of this, of course, we have ample evidence, knowing, as we do, of the elimination of many medicines by the milk, such as iodide and bromide of potassium, rhubarb, and lead. We often find that infants are griped and made uncomfortable by their mother's medicine, and we must remember this in prescribing, even if we are allowed to forget it by the patients themselves, who are usually well-informed on this point. But little advantage has hitherto been taken of this way of treating young children, and it seems hardly admissible to recommend a larger recourse to so roundabout a plan, as some of the substances used in this way might check the secretion of the milk by impairing the health of the mother, and as there is no real difficulty in giving effective doses of therapeutic agents to children even at so early an age.

When we come to number two, however, some interesting speculations are encouraged, for we have to consider in how far we can modify or affect the condition of the fœtus in utero by drugs administered to the mother. There is no doubt that a strain of syphilitic infection has been arrested by mercury given to the mother during pregnancy, and that the infant thus vicariously treated was the first out of a long series which proved to be free from all specific taint. Iodine and salicylic acid, quinine, santonin, and nitrate of potash have been detected in the urine of the fœtus whose mother had taken those substances, and Dr. McClintock, of Dublin, records six cases in which the regular recurrence of abortions was checked by giving iron and chlorate of potassium[1] to the mother.

It is probable that drugs given to the mother at the time of labor are more liable to injure the child than during the period of pregnancy, because of the interference with the eliminating function of the placenta.

10. Prescription Writing.—We next come to the construction, or what we may call the anatomy, of the prescription itself, how it is put together, and how its component parts are arranged; and we commence with the '℞' with which it begins, and which really means an old invocation to Jupiter. But, conventionally, it has been held to imply the verb *recipe*, which governs the quantity in the accusative, the name of the medicine being put in the genitive. Thus, *Recipe* (take) *pulveris* (of powder) *scammoniæ* (of scammony) *scrupulum* (a scruple), etc. Other direction are laid down in books which deal with this question, and much valuable information is contained in Pereira's 'Selectæ Præscriptis' and the clear and instructive little work of Dr. Griffith, of Dublin; but it is hardly necessary to reproduce these here, as students beginning their medical curriculum are presumably sufficiently well grounded in classics to enable them to understand the very moderate amount of Latin required for their use in prescribing. As a rule, most medical men write their directions nowadays in English; and this has not only the advantage of limiting the chance of mistake, but it does away with much of that mystery which beyond anything else has tended to keep back the progress of our art. In these enlightened times, when even more than a smattering of physic is commonly possessed by the laity, we do not find our patients quietly consenting to be kept in the dark as to what medicines they are taking. Rather we find them showing a keen interest in our prescriptions, anxious to inquire, and argue, and, if possible, understand all about the line of treatment we have determined to pursue. The cases are very rare in which it is necessary to conceal from them the presence of any particular drug in their mixture, and Latin directions are therefore not only unnecessary, but pedantic in the highest degree. It is still, however, the custom at examining boards to ask the candidates to write and read prescriptions fully constructed according to this custom, and in the prescriptions which we shall frequently add to our descriptions of the various drugs we shall invariably give the directions in Latin of the usual form.

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[1] Brit. Med. Journal.

11. Weights and Measures.—It only remains for us, then, to add the signs and symbols in general use, which are as follows:—

gr., granum . . .	=	. . . .		1 grain.
℈, scrupulum (scruple) .	=	. . . .		20 grains.
ʒ, drachma (drachm) .	=	3 scruples	=	60 grains.
℥, uncia (ounce troy) .	=	8 drachms	=	480 grains.
℔, libra (pound) . .	=	12 ounces troy	=	5760 grains.
♏, minimum (minim) .	=	. . . .		1 minim.
fʒ, fluidrachma (fluid drachm) . .	=	. . . .		60 minims.
f℥, fluidnncia (fluid ounce) . .		8 fluid drachms	=	480 minims.
O, octarius (pint) . .	=	16 fluid ounces, U. S. P.	=	7680 minims.
C, Congius (gallon) .	=	8 pints .	=	61440 minims.

In the British Pharmacopœia the time-honored drachm and scruple weights have been discarded, and all who prescribe or dispense medicine are recommended to discontinue their use; but old-fashioned customs are not so readily swept away, and we accordingly find these most convenient terms flourishing as much as ever. In domestic practice we find a much more rough-and-ready mode of prescribing, the generally received measurements being as follows:—

Drop (usually about ½ minim) = gtt., gutta.
Teaspoonful . . . . = 1 fluid drachm.
Dessertspoonful . . . = 2 fluid drachms.
Tablespoonful . . . = 4 fluid drachms.
Wineglassful . . . = 1½ to 2 fluid ounces.
Teacupful . . . . = 5 fluid ounces.
Breakfast-cupful . . . = 8 fluid ounces.
Tumbler . . . . = 10 to 12 fluid ounces.

Of all domestic modes of measurement, however, none can equal the drop in fallacy and danger. The size of the drop is influenced first by the shape of the bottle, and secondly by the quality of the fluid itself, and hardly any two substances will be found to contain the same number of drops in a given quantity.

Tablespoons, teaspoons, and all domestic measures are most absurdly variable in size, and we shall do well steadily to discountenance their use in all cases, and to insist that our patients shall carefully regulate their dose by means of those graduated glasses which are within the reach of all but the very poorest.

Although it would manifestly be lulling our readers into a false security, were we to attempt to lay down any absolute rules respecting dosage, we may venture to state some broad principles which will help the memory. Students often complain of the great difficulty they experience in remembering doses, and at first sight it would appear a most irksome task for a person not in the habit of prescribing to carry in his mind the major and minor quantities of drugs which he may safely order. But by giving a few rules, and adding exceptions, as in the Latin grammar, we hope to show that there is no real difficulty here, but that we may safely group substances in such a way as to associate their doses with one another with tolerable simplicity. But first let me say one word about the British Pharmacopœia. Constructed as it was by official authority several years ago, it is naturally looked upon as our *vade mecum*, and every student is supposed to possess a copy, and to make himself familiar with its contents. In the first edition no doses were given, and in the next, although these were added in deference to a universal request, it was expressly stated that they were not to be considered authoritative, or specially enforced by the Medical

Council. But the Pharmacopœia being the only official guide, has now been forced into a position respecting dosage which its framers did not intend or desire, and we accordingly find that in any case of difficulty its authority is invariably appealed to. It lies on every druggist's counter, it is the standard in courts of justice, and, this being the case, it ought to reflect the most advanced researches on its subject. But this is not so; on many points its recommendations are hopelessly at variance with modern practice, and we are hence exposed to the annoyance and possible discredit of having our prescription sent back or cut down by druggists who are afraid of exceeding the dose sanctioned by authority. Thus the maximum dose of succus conii is fixed by the Pharmacopœia at fʒj, of quinine at gr. x, digitalis fʒj; and when we come to consider the various substances in succession, we shall find many other examples of a discrepancy between our teaching and its statements, which this explanation will clear up. [These difficulties are avoided in the United States Pharmacopœia, the doses of remedies being judiciously omitted.]

We may now proceed to indicate the natural system of grouping, by which some order may be given to the arrangement of the doses of drugs in the already crowded brain of the student or the young practitioner.

Thus let him remember that, as a general rule, tinctures may be prescribed in doses of from ♏x to fʒj, infusions and decoctions from f℥ss to ℥ij, powders from two to ten grains, pills four to ten grains; and although there are numerous and very important exceptions to this, the recollection of the principle will spare us from the drudgery of placing the exact dose after every preparation whose action we shall examine.

[The following are some of the important exceptions to this rule:—

Infusum brayeræ,	U. S. P.	Tinctura nucis vomicæ,	U. S. P.
" digitalis,	"	" opii,	"
Tinctura aconiti,	"	" " acetata,	"
" belladonnæ,	"	" " deodorata,	"
" cantharidis,	"	" physostigmatis,	"
" capsici,	"	" scillæ,	"
" digitalis,	"	" stramonii,	"
" iodi,	"	" veratri viridis,	"
" ipecacuanhæ et opii,	"	" pyrethri is only used externally.]	

These rules may be borne in mind in a general way, and we shall now go on to consider very briefly the plan of arrangement to be pursued when we come to consider the various medicinal substances seriatim. Our object will be to balance, as far as possible, their physiological against their therapeutical action, arranging them in corresponding columns in diagrammatic form; and it will greatly assist this arrangement, as well as aid the memory of the student, if we adopt the following order in stating what we know respecting the properties of each drug.

Take, first, its local or external action.

Then its influence on the brain and on the spinal and sympathetic system of nerves.

This will lead us up gradually to the effects on the heart and bloodvessels, whose functions are presided over and ruled by nervous influence.

The effects of the drug on respiration and temperature will next be considered, and we then proceed to the alterations of secretion in the following order, urinary, intestinal, salivary, cutaneous, etc.

Then other actions which come under no heading, and which may be called specific.

Finally, we must consider the various modes of elimination from the body, the antidotes, contra-indications, and best modes of prescribing; winding up, in most cases, with a prescription which will, as far as possible, combine efficiency and elegance with palatability.

Regarding the method in which the following pages will be arranged, a few words may be said.

Different modes of grouping drugs have been adopted, and by some the preference is given to the purely physiological plan, by which all the medical substances having a particular action are placed under that special heading; thus, we have purgatives, narcotics, astringents, etc., as different varieties, with their attendant species. No doubt such a plan has the merit of scientific precision, and, had each drug only one medicinal action, nothing could be simpler or more effective than this arrangement, of which Neligan is the chief exponent. But an unfortunate element of complication is introduced by the fact that one drug may act in many, and indeed opposing, ways. Thus, whilst opium is an astringent, it has every right, under certain circumstances, to be called a purgative; its stimulant action is as evident as its narcotic; it is a diaphoretic, a sedative, an antiphlogistic; and the confusion inseparable from hunting it about among its various headings must necessarily be perplexing to the mind of the student, as well as occasion loss of time. Many other drugs behave in the same way, so it has been thought best to adopt the arrangement of Garrod and other popular text-books, in which the inorganic substances are placed alphabetically, and the organic in accordance with the natural orders to which they belong. We shall only venture to make one modification, and that will be to remove the general principles of therapeutics from their usual position at the end of the book, and scatter their classification systematically through our pages. For instance, after treating of the leading member of the purgative or narcotic group, we shall use that as a peg on which to hang a general description of that class of substances in general, and in this way we may hope to relieve that tedium which is apt to arise when too many deductions and generalizations are presented *en masse*. The brief space necessarily at command in the following pages, and the dogmatic tone so necessary for teaching, may possibly tend to create in the mind of the reader an undue confidence in the curative power of drugs. Unhappily we cannot emulate the confident faith of homœopathists, who label their tinctures and globule bottles with the names of special diseases which the contents are believed infallibly to cure. We have as little admiration for this overweening confidence as for the scepticism of some modern writers, who would fain have us believe that drugs have no influence over the processes of disease. Nothing can be more paralyzing to progress than this tone of thought, and we should recommend to our readers in preference an excess of faith, and an earnest determination to work out the clinical bearings of therapeutics.

Experiments on animals have done good service; and we have only to point to the brilliant researches of Rutherford in proof of this assertion; but what is even more wanted are accurate and extensive trials of drugs in practice by well-instructed general practitioners. Extended and well-recorded observations from the wide field at their disposal will not only be cordially received by the profession, but will be of real service in giving us data from the only sure basis on which we can build up our opinions and practice with reference to the real actions of drugs.

Convinced although I am of the great importance of drug treatment in many diseases, one of the first lessons to be learnt in practice is the infinite value of careful watching and nursing, feeding, and general hygienic arrangements.

The importance, for instance, of free ventilation, of open windows without draught, of fires as ventilating agents, of the prompt removal and disinfection of all discharges, of quiet, firm, and skilful nursing, of well-arranged bedding, including quiet, and the careful exclusion of the beams of early morning light, are points of importance only to be thoroughly appreciated by the practitioner.

The well-instructed medical man will do well to make some little study of cookery, so as to devise and even superintend dainty dishes for the sick, as well as to see that the beef-tea is clean and strong, and the general dietary varied and appetizing. He must remember the necessity for forbidding solid food in acute disease, but most especially in acute rheumatism and enteric fever, the evil influence of starch or sugar in diabetes, of an excess of nitrogenous or saccharine articles of diet in rheumatism and gout. And when the acute symptoms have gone by, and convalescence is established, he must be able to recommend to his patient the best form of change of air; of foreign spa or bath, of Swiss or Scottish air, unless he is prepared to lose caste at a time when such knowledge seems of greater value than even the more special familiarity with drugs proper.

[THE METRIC SYSTEM IN MEDICINE.[1]

In order to translate our prescriptions into the metric system when so desired, it is only necessary to bear in mind that the Gramme or unit of weight is equal to nearly 15½ grains (troy), and that a gramme of water occupies the space of a cubic centimetre. The relation therefore between the two systems would be as follows:—

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[1] For further details, see Weights and Measures at the end of the book.

OLD STYLE.		METRIC.	
♏ j or gr. j	equals	.06	Gm.
fʒj or ʒj	"	4	"
f℥j or ℥j	"	32	"

A teaspoonful is usually 5 Gms.; a tablespoonful 20 Gms.]

REMARKS

ON

CERTAIN CLASSES OF REMEDIES.

ACIDS.

We will first take up the consideration of acids, and, before enumerating the therapeutic properties of each individual member of the group, it will save time and repetition if we draw attention to the collective actions and uses of acids in general.

EXTERNAL ACTION.

Physiological.	*Therapeutical.*
Acids, being possessed of high diffusive power, rapidly permeate tissues to which they may be applied, coagulating their albumen, and, if concentrated, absorbing their watery constituents and causing their destruction.	Acids, if used in concentrated form, therefore, act as *caustics*, eating away and destroying animal tissues. When more diluted they are *astringents*, hardening and constringing weakened parts and checking unhealthy secretions.

INTERNAL ACTION.

1. *On Circulation.* — All the acids have the property of increasing the acids of the blood, probably rather by setting free another acid than by a direct action on that fluid; for by the time they enter the circulation they are themselves converted in great measure into salts by	1. The action of acids in checking hemorrhage is thus explained, as there is no doubt that coagulation is encouraged by an acid condition [or a decreased alkalinity] of the blood.

the various alkaline secretions with which they have come in contact.

2. They may also contract the smaller bloodvessels by reflex action, or by directly astringing them locally.

[In fever they relieve thirst and tend to reduce the temperature.]

3. Their action on *secretion* is interesting, and has been specially pointed out by Ringer. It appears that an acid applied to the orifice of a gland secreting an acid fluid will check that secretion, and thus any member of this group taken into the stomach before or at the beginning of the process of digestion will tend to act unfavorably by stopping the flow of gastric juice.

[The inorganic acids do not favor fermentation, and some of them, like hydrochloric acid, sulphurous acid, and carbolic acid, are decidedly antiseptic.]

2. They are useful in external hemorrhage, and to check excessive perspiration [or abnormal discharges].

[Salicylic acid has been used as an antipyretic, and especially in acute rheumatism, with decided benefit. Acid drinks are grateful to fever patients.]

3. This physiological action points to a valuable bearing on therapeutics. Some cases of dyspepsia depend on a deficient production of gastric juice, enough of this fluid not being secreted under the stimulus of food to dissolve and digest the albuminous constituents. This condition may be remedied by mechanically supplying the want by a little acid given some time after food. But again, still more cases of disordered digestion are caused by an excessive formation of gastric juice, the surplus supply of acid teasing and worrying the mucous membrane of the stomach, and causing pain, sour eructations, and general distress. Here our physiological law comes into play, and we check the over-secretion by giving the acid immediately before the meal. Or again, discomfort may result from irregular or excessive fermentation of food,

But if acids arrest secretions having their own chemical reactions, they stimulate those which are alkaline, markedly increasing their quantity. Thus we find that they tend to promote the flow of the saliva, of the bile, and of the pancreatic secretion.

On the Urine.—Inorganic acids increase the acidity of the normal urine, but have no power of rendering an alkaline urine acid. The property is alone possessed by benzoic and citric acids.

4. Acids, by their astringent properties, brace up relaxed mucous membranes, and check unhealthy secretion.

giving rise to the formation of a large quantity of acetic, butyric, and lactic acids; and this undue fermentation is found to be itself directly controlled by acids given in this case after food. Possibly some of their influence in checking acid perspiration may be due to this law.

We can thus explain what has been called the refrigerant action of acids, or their undoubted influence in relieving thirst and imparting a fictitious sensation of coolness. By stimulating the secretion of the salivary glands, we moisten the dry, parched mouth of our fever patient, and quench his thirst perhaps better than in any other way.

It is probable also that some at least of the beneficial influence exerted by acids on chronic biliary derangement is due to their directly increasing the flow of alkaline fluid from the liver.

4. They are, therefore, good tonics, and act well in diarrhœa and profuse sweating.

DISADVANTAGES.

The prolonged use of acids is apt to exercise a very unfavorable influence on digestion, rendering persons pale and languid, and causing a good deal of emaciation. This was, no doubt, the secret of the action of vinegar in reducing corpulence, which used to be so highly prized in the Byronic days, and by incautious indulgence in which so many ignorant people have at various times ruined their health.

POISONOUS EFFECTS.

The symptoms consist of very violent burning pain in the stomach and intestines, vomiting, purging, intense prostration, and death either by shock or from the results of secondary inflammation. On *post-mortem* examination, intense inflammation of the stomach and intestines is found, with ulceration of the mucous membrane, and even perforation into the peritoneal cavity; and if the case is of a more lingering character, fatty degeneration of various internal organs, but more especially of the kidneys, becomes gradually developed. [The treatment of poisoning is to be found under the respective heads, according to the acid employed.]

ANÆSTHETICS.

For a full discussion of the physiological and other properties of anæsthetics the reader is referred to the subject of Ether, Chloroform, and Nitrous Oxide Gas in the succeeding section. The consideration of their relative value, as stated by Dr. Clover, may be here briefly considered under the head of

THE CHOICE OF ANÆSTHETICS.

"For ordinary surgical cases ether is safer than chloroform.

"The length of time needed to get a patient under ether is no longer a difficulty. Within the last four or five years the use of ether has increased rapidly in England in consequence of the adoption of better methods of administering it. Formerly the ether was given so abundantly as to excite choking and violent struggling. Now, methods which produce a certain degree of asphyxia by preventing the access of fresh air, and allowing the same air to be breathed over and over again, are generally adopted. By causing this degree of asphyxia, the patient is made to take deep and frequent respirations which carry the etherized atmosphere down to the lung-cells. The atmosphere is thus made effective without being so strong as to cause local irritation. The least unpleasant way of inhaling ether is to begin with laughing-gas only, and then introduce ether-vapor gradually along with the gas, without allowing any fresh air to be admitted.

"Chloroform is most suitable for children and for aged persons with brittle arteries, also for sustaining the anæsthesia during protracted operations inside the mouth. In some cases of operation on the eye, when it is desirable to diminish the hemorrhage, chloroform is better than ether. In midwifery practice the same may be said.

"Laughing-gas is best for ordinary tooth-extraction, for reducing luxations or moving stiff joints, for opening abscesses and fistulæ, and other cases where anæsthesia is required only for a short time. For those operations which last from five to fifteen minutes it is found that laughing-gas, followed by a small quantity of ether, and a very limited supply of fresh air, is the anæsthetic least often attended by sickness. The recovery of sensation is, however, much more rapid than when chloroform or ether alone has been used to the same effect, and where great pain is expected to result, a hypodermic injection of morphine is also needed.

"The mixture of nitrite of amyl with chloroform has been strongly advocated by Dr. Sandford, an American physician. I have tried it in a dozen cases, and find that it produces insensibility rapidly, and, if the anæsthetic is then removed, the recovery is very satisfactory; but when the inhalation is continued for three or four minutes there seems to be nearly as much subsequent depression and nausea as if pure chloroform were given. The nitrite has also the effect of producing a sense of fulness in the head in the surgeon and assistants, which is rather objectionable."

ANTHELMINTICS.

The human body being infested with various parasites, whose presence is inconvenient and even dangerous, it is necessary for us to be provided with means for their safe and speedy removal. Some of these unwelcome guests are, unfortunately, out of the range of medicine; but others are so placed that they can readily be destroyed; and we shall arrange them in classes, according to the several drugs which act especially upon them.

1. **Tape-worms** are, the tænia solium, derived from

1. The best remedy for the tænia is now believed to be

eating measly pork; the tænia medio-canellata, from veal or beef; and the tænia lata, from salmon. These occupy the small intestine, and give rise to various ill-defined but uncomfortable sensations.

2. The **round-worm**, or **ascaris lumbricoides**, inhabits the small intestine, and occasions a long array of nervous symptoms, more especially in children. These worms are supposed to be introduced into the system by impure water.

3. The **thread-worm**, or **oxyuris vermicularis**, resides in the cæcum or colon, and causes much itching and irritation around the anus. They are almost universal among the children of the poor, but opinions differ as to whether they must be regarded as the cause or the

male-fern oil [oleo-resina aspidii] given on an empty stomach; but if this should possibly fail, we may have recourse to kousso, turpentine, pomegranate root [pelletiérine], or areca nut.

[Pumpkin seed (one or two ounces) made into emulsion with milk is a good domestic remedy.]

We must remember that, although these remedies kill the worms, they do not necessarily expel them from the intestines, and that a purgative may be required for this purpose. It is also essential to find the head of the tape-worm before we can assure our patient that he is freed from his tormentor.

2. Santonin acts as a true specific in at once destroying these troublesome parasites. [It is usually combined with calomel and soda to prevent the peculiar symptoms of santonin poisoning. Spigelia and senna have a well-deserved reputation for expelling these worms.]

3. It would seem rather a roundabout practice to attack parasites in the lower gut by drugs administered through the mouth; and although occasional purgatives, such as scammony, calomel, jalap, etc., are of use in these cases, our chief reliance must be placed on enemata of quassia,

effect of the peculiarly cachectic condition with which their presence so often coincides.

Other forms of parasitic intrusion within the various tissues are well known, but are generally incurable; and the trichina spiralis, the various forms of hydatid disease, etc., must usually be permitted to run their destructive course unchecked. When, however, hydatids are placed in the liver, they are frequently effectually removed by tapping, whilst those in the lungs not uncommonly undergo spontaneous cure.

tincture of iron, lime-water, common salt, etc. [and strictly regulating the diet.]

In the general treatment of parasites, however, we must not trust entirely to the use of anthelmintics, but must also exclude all possibility of infection by forbidding raw or underdone meat, or fish, and by insuring general cleanliness and an uncontaminated water-supply. In addition to this, we must remedy the unhealthy condition of mucous membrane which favors their development, by giving alkaline remedies and bitter tonics in various forms of combination. [Glycerine has proved effective in trichiniasis.]

In prescribing our remedies for the expulsion of the tapeworm, it is well to secure a thorough evacuation of the intestines, so that the parasite may not be in any way shielded from the action of the drug by food or mucus. After a preliminary purge, we direct our patient to fast for a few hours, and then administer the fern-oil in milk, either at bedtime or in early morning.

PARASITICIDES.

The *various* external parasites which infest the body may be divided into:—

1. *Animal*, including the Guinea-worm, the *acarus scabiei* causing the itch and the various pediculi met with on the head, pubis, and other hairy regions. [Fleas may infest the clothing.]

1. The Guinea-worm is removed by gentle traction; the itch insect destroyed by sulphur or staphisagria; and the lice killed by mercurial applications [or insect powder and soap and water.

Body lice and fleas require disinfection or destruction of clothing as well.]

2. *Vegetable*, to which parasitic skin-diseases are due. Thus we have the *microsporon furfur* of pityriasis versicolor, the *Achorion Schönleinii* of favus, the *Tricophyton tonsurans* of tinea tonsurans, and the various other forms met with in tropical practice.

2. The various parasitic diseases of the skin are of too well-known obstinacy, and may be treated in a variety of ways. Iodine, acetic acid, chrysarobin, mercurials, sulphurous acid, carbolic acid, and a long array of drugs have each their enthusiastic partisans.

ANTIDOTES.

The first thing to be done in any case of poisoning is to empty the stomach, and to eliminate the poisonous substance from the tissues.

This may be effected in the first place by emetics, and more especially those of the direct class; but, it will often happen, particularly in narcotic poisoning, that emetics will not act, and that we are forced to have recourse to the stomach-pump. Caution in the use of this instrument, however, is requisite in cases of irritant poisoning in which the mucous membrane of the stomach is softened or partially destroyed. When evacuation of the stomach has been completed, we may employ gentle purgatives and diuretics in addition to such remedies as iodide of potassium which favor the elimination of metallic substances.

The next stage in our proceedings must be to obviate the tendency to death, according to the various vital

Thus, if cardiac syncope be the main symptom, we must give stimulants; if the respiratory centre seems in processes attacked by the poison.

Having got so far, we must then proceed to use our antidotes proper, which may be divided into (1) Chemical, which directly neutralize the action of the poison by destroying its properties; and (2) Physiological, which have distinctly antagonistic properties, being, indeed, in many cases, absolute counter-poisons.

danger of becoming paralyzed, we must excite respiratory action by cold affusion, irritation of the skin, and the employment of artificial respiration, and give atropine which stimulates the origin of the pneumogastric nerve in the medulla; if narcosis prevail, we must endeavor to rouse the brain; and if irritation of any particular organ arises, we must soothe it by appropriate remedies. [The aid of electricity will be found to be not only useful, but in some cases absolutely indispensable.]

1. Among the first class we may rank alkalies in acid poisoning, animal charcoal [and tannic acid] as rendering the vegetable alkaloids innocuous, and liquor potassæ as depriving belladonna and its congeners of all physiological power.

2. The second contains all those various substances which will be found described here and there in these pages as directly antagonistic to one another, as opium within certain limits to belladonna, Calabar bean to atropine and strychnine aconite to digitalis. This class of antidotes has the advantage over the more purely local or chemical, that they are able to pursue their foe into the blood, and attack it boldly and successfully there.

[Antidotes to special poisons are considered under their appropriate headings in the succeeding sections. At the close of the book will be found a condensed "List of Poisons and their Antidotes" for convenient reference and study.]

ANTIPYRETICS AND REFRIGERANTS.

ANTIPYRETICS.

Antipyretics are remedies which reduce the bodily temperature, some acting only against the preternatural heat of febrile conditions, whilst others can also cool down the natural warmth below the normal standard. We may thus divide their action:—

In this country we are not much in the habit of regarding the temperature, *per se*, as a special element of danger, unless it goes beyond a certain height, and we, therefore, do not, as a rule, treat this symptom very energetically. Foreign experience seems to show that, although we may reduce the actual heat in acute disease, we do not necessarily alter the course of the attack, and we, therefore, usually confine our efforts to supporting our patient and looking out for complications. On the other hand, however, when the thermometer registers 105°, and still tends upwards, we are bound to interfere.

Class 1. Those which act by directly cooling the surface of the body by local application.

1. This is, undoubtedly, our most effectual antipyretic means, and may be carried out by cold affusion, wet pack, or, best of all, by the carefully graduated cold bath.

Class 2. Those which act by internal administration, either lessening oxidation, or exerting some special influence on the nervous system.

2. This class consists of the antipyretic drugs, properly so called, such as quinine, digitalis, veratria, alcohol, salicylic acid, etc.; but,

	with the exception of the last-named, they are not much used for this purpose. It is a remarkable fact, that very few, if any, of these drugs have the power of reducing the normal temperature, save when given in large and almost poisonous doses (*vide* Alcohol, Quinine, etc.).
Class 3. Those which act by dilating the superficial vessels and enabling a larger sheet of blood to be spread over the cutaneous surface, and thus brought in contact with the cooling influence of the air. The chilling effect then produced by the return of the circulating fluid to the heated centres, although very transient, may become considerable by repetition.	3. Under this heading we must include the whole class of diaphoretics, as well as chloral hydrate, the warm and Turkish bath, etc. [Cardiac depressors like aconite, arnica, and veratrum viride have also the effect of dilating the arterioles and reducing blood pressure and temperature in this way.]
Class 4. Remedies which act by bracing up and strengthening the nervous system, and removing some of that enfeebled and semi-paralyzed condition on which febrile temperatures have been supposed to depend.	4. A rising temperature being often an indication of debility, we may then check it by tonics, good food, small doses of alcohol, etc.

Liebermeister and those who agree with him adopt the antipyretic plan in its entirety and combine these various agents. Whilst using very frequent baths, as often as every two hours—in severe cases two hundred, even, having been given during one illness—he orders quinine in large doses, holding it first among cooling agents; digitalis where the heart is strong, thus reversing our usual therapeutical rules; and veratrine, which seems to act by causing a kind of collapse. Statistics, however, do not show any superiority of this over the more expectant plan practised in England. Prof. Gairdner (*Glasgow Med. Journal*, September, 1878) well calls the German plan a battledore and shuttlecock treatment, consisting, as it does, "in keeping the patient, partly by means of cold baths, and partly by these other remedies, in a state of constant oscillation between fever and incipient collapse."

REFRIGERANTS.

Refrigerants, of course, necessarily include all remedies which actually lower the bodily temperature, but the conventionally accepted meaning of the term merely implies anything which alleviates thirst. Thus we find that the mere sipping of any fluid moistens the dry tongue and lessens the thirst of fever, whilst acids, by stimulating the secretion of saliva, may fulfil the same indication in a more scientific and effectual way.

DISINFECTANTS AND ANTISEPTICS.

Disinfectants are "agents capable of so modifying the contagium of a communicable disease, during its transit from a sick to a healthy individual, as to deprive it of its specific power of infecting the latter." (Baxter.)

Antiseptics have the power of arresting the activity of septic germs, or of destroying their vitality. The principal antiseptics are carbolic acid, creasote, zinc chloride (thymol, boric acid, salicylic acid), sulphurous acid, corrosive sublimate, and sodium chloride.

[ASTRINGENTS AND CAUSTICS.

The property of astringency, or "puckering," is possessed by vegetable substances containing tannic acid and its derivatives; and, on the other hand, by many mineral salts. Astringents generally possess the power of coagulating albumen, but their therapeutic effect is rarely required to this extent; in less degree of strength they excite a tendency to condensation or contraction of living organisms, partly, but not mainly, by local influence upon the unstriped muscular fibres. In a higher degree they generally act as irritants, or even caustics. When used to check bleeding they are termed styptics. Astringents find their greatest field of usefulness in a relaxed condition of mucous surfaces with excessive follicular secretion. In cases of inflammation their tendency to exercise an irritant influence should not be lost sight of.

Extremes of temperature such as are obtained by either hot or cold applications will check hemorrhage; the cold acts as an astringent, but the heat more rapidly coagulates blood.

The vegetable astringents are tannic and gallic acids, and their allied forms, as kino-tannic and catechu-tannic and gallo-tannic. Acetic acid and weak solutions of carbolic acid also are decidedly astringent. It may be that the effect of chrysophanic acid in psoriasis is largely due to an astringent effect upon the vascular supply of the diseased skin.

The principal mineral astringents are sulphuric acid, and the soluble sulphates generally, particularly the ferrous and cupric sulphates; but the soluble compounds of zinc, silver, lead, copper, cadmium, and aluminium are generally astringent. The ferric salts with mineral acids, the ammonio-ferric sulphate, the calcic hydrate and carbonate, alum, subnitrate and subcarbonate of bismuth, and some of the volatile oils and resins are also to be included in this category.

Caustics are used to destroy tissues, and belong more particularly to surgery. When the application is mitigated or used in dilute solutions, the first effect of caustics, as a rule, is that of a stimulant and irritant, and they may exert an astringent effect. The principal agents used as caustics may be classified according to their action as follows:—

CAUSTICS.

PENETRATING.	CIRCUMSCRIBED.
Acetic acid.	Dried alum.
Bromine.	Dried zinc sulphate.
Chromic acid.	Heat.
Mercuric nitrate solution.	Potassa with lime.
Potassa.	Silver nitrate.
Sulphuric type-acids.	Zinc chloride.]

COUNTER-IRRITANTS.

The theory of the action of epispastics and rubefacients has given rise to much interesting physiological speculation, but we are not yet able to lay down, with absolute precision, the laws on which the beneficial action of these remedial agents depends. We know this much, however, that blisters may occasionally act locally on deeper-seated parts, as we are told that redness and inflammation of the pleura and peritoneum may be produced by the vesicating influence of cantharides applied to the cutaneous surface superficial to these structures.

Then, again, vascular connection may explain other phenomena, and more especially may this be traced in the chest between the pericardial vessels and those of the skin immediately over the heart, and in the lumbar region between the superficial vascular supply and that which furnishes to the kidneys their due allowance of arterial blood.

These more direct and obvious explanations of various interesting therapeutical phenomena do not, however, lead us very far, and we are compelled to fall back upon much more abstruse considerations. Into these neither our space nor the scope of the present volume will permit us to enter very far, and we only very briefly draw a slight outline of those branches of the question which seem to have reached something of vigorous growth.

Now for the relief of pain, counter-irritation may act, 1st, by removing or modifying the structural condition on which the reflected suffering depends, as we often cure a facial neuralgia by extracting a carious tooth; or 2d, the end organs of the sensory nerves may be modified in molecular arrangement; or 3d, the trunks of the nerves themselves, or the nuclei or the nervous centres, may be altered in some unexplained way by the stimulus applied to the seat of pain.

For other purposes, also, counter-irritation may act by altering or re-distributing blood supply, as by actually emptying the deeper vessels and filling the more superficial arterioles at their expense; or special function or nutrition may be profoundly affected by influencing the trophic or other nerves which more especially preside over these departments of the economy.

The practical applications of counter-irritation in the treatment of disease are both numerous and interesting, and when considering iodine, mustard, and cantharides, we will devote some space to the consideration of the principles which should guide us to their successful use.

DIAPHORETICS AND ANHIDROTICS.

This class of remedies has the property of increasing the secretions of the skin, and is usually divided into (1) the stimulating and (2) the sedative. Under the first heading we include those drugs which stimulate the cutaneous circulation, among the principal of which are ammonia, alcohol, the cold bath, phosphorus, etc.; and, secondly, we speak of the sedative class, which act by dilating the superficial vessels, these being ipecacuanha, tartar emetic, jaborandi, aconite, the warm and hot air bath, and all the nauseating and emetic substances, the depressing action of which is invariably attended by free perspiration. Then again we must refer to what are known as adjuvant remedies, such as warmth to the surface, diluent drinks, etc.

Diaphoretics are used freely in practice at the outset of acute diseases, to relax the contracted vessels and relieve the hot, dry skin; and in pneumonia this line of treatment has produced good results. The sedative class would seem to be best adapted for this purpose; but the cold bath, which more naturally belongs to No. 1, has been freely used abroad in febrile disorders, and part of its beneficial effects must no doubt be due to its action on the skin.

In eruptive fevers, when the eruption is not sufficiently developed, we endeavor to excite the function of the skin, and thus favor the local manifestation of the poison, by warm baths, wet-packing, and possibly by phosphorus. We also use diaphoretics to favor absorption, as in various dropsies, and to relieve the kidneys, between which and the skin so much sympathy exists.

They are also of service by assisting to eliminate morbid products from the blood. When the various internal organs, whose duty it is to get rid of certain effete and hurtful matters, are temporarily or permanently off work, we may hope to supply their place in some measure by the skin, and in Bright's disease we may thus relieve the system of some urea; in jaundice, of biliary products, etc.

DIURETICS.

Diuretics stimulate and increase the flow of watery fluid through the kidneys in various ways, which we may conveniently classify under the following headings:—

Class 1. Stimulating diuretics, which act by directly exciting or irritating the glandular secreting structures of the kidney.	1. These are cantharides, turpentine, colchicum, squill, nitrate of potassium, etc., but they are rarely thus used, as they are liable to produce pain, strangury, and even hemorrhage. Cantharides has, however, been recommended in some forms of chronic albuminuria and in pyelitis.
Class 2. Those drugs which stimulate the circulation, called by Gubler vaso-motor diuretics, causing increased arterial tension, and thus greater pressure on the walls of the Malpighian bodies, by which means transudation of watery fluid is mechanically favored.	2. The principal of these are digitalis, belladonna, squill and ergot; and they are of service in various dropsies, and perhaps most especially in those which depend on disease of the heart.
Class 3. We next come to the saline diuretics, which, in addition to some slightly stimulating influence, have a special power of absorbing and holding watery fluids, which they then carry with them in their exit from the body.	3. In this group we include the lithium, potassium, and sodium salts, and most of them possess a double action, being diuretic in small, and purgative in large doses. They are also used with advantage in anasarca and dropsical accumulations.

Class 4. Mechanical diuretics must next be included in the list, and among the principal of these we may mention water, which acts by washing the urinary tubules clear from epithelium or casts, which block them under certain conditions, and so allowing secretion to be re-established. Under this heading we may also group those remedial means which act indirectly by relieving the kidneys in various ways. Thus, when congestion is present, local bleeding, dry cupping, warm fomentation, etc., may be the best diuretics. When the kidneys are pressed upon by ascitic fluid, a renewal of their full function frequently follows the operation of tapping, and in many cases we may give these organs temporary rest by handing some part of their duties over to the skin or the bowels.

4. Dr. Dickinson has shown how well copious draughts of water act in the acute desquamative nephritis of children, on the mere mechanical principle of sluicing or washing out the obstructed tubules. The indirect diuretics are often of most service in renal disease; and Christison, Gairdner, and other experienced authorities have always upheld the benefits to be derived by the treatment of Bright's disease in all its stages by the less stimulating forms of diuretics. A good way of promoting the absorption of fluid effusions and of largely increasing the urinary flow, is by placing the patient on a very dry diet and cutting off, as far as possible, the supplies of fluid.

Diuretics are notoriously uncertain remedies, and many of them have not the slightest power of increasing the flow of urinary water during health. They also vary much in their power of promoting the elimination of urea and other products of excretion by the kidneys. They may be given either by the mouth or by vapor (in which way oil of juniper acts well); or, as in the case of digitalis, they may be efficiently used by cutaneous absorption. In their administration we must observe the following rules: Give them freely diluted, and, as a rule, combined with one another, several remedies of the class seeming to act better than one, as in the famous Guy's pill. Keep the patient cool, so as to avoid any action on the skin, and endeavor to prevent the bowels from coming too freely into play.

EMETICS.

The object of an emetic is to stimulate the so-called vomiting centre in the medulla oblongata, close to the origin of the pneumogastric nerve, and induce it to call forth the complicated series of muscular acts which terminates in evacuation of the stomach. Emetics act in two ways, and are thus classed, as:—

1. *Direct.*—Where the drug irritates the filaments of the pneumogastric nerve distributed to the mucous membrane of the stomach, and this irritation, being transmitted to the centre, is reflected in motor impulses through the pneumogastric, phrenic, and intercostal nerves. The direct emetics are prompt in their action, and cause little nausea and depression; and the principal members are zinc sulphate, copper sulphate, ammonium carbonate, mustard, common salt, etc.

2. *Indirect.*—Emetics of this class are conveyed directly by the medium of the blood to the vomiting centre, and act well by injection without coming into contact with the stomach. They are less prompt and more depressing than those of the other class. Principal members: Ipecacuanha (emetia), tartarized antimony, apomorphina, veratrina, and delphinina.

The reflex chain then being established by which the muscular apparatus causes vomiting, we must next consider the various steps of the process.

Physiology of Vomiting.

1. In the first place the cardiac sphincter of the stomach must be relaxed, or no vomiting can take place, and the persistent contraction of this structure may account for many cases of distressing retching.

2. The actual contraction of the walls of the stomach itself must be supplemented by that of the abdominal parietes.

Therapeutics.

Emetics are used to empty the stomach in cases of poisoning, and here we invariably employ the direct class, such as the zinc sulphate, mustard, salt, etc. If the patient be unable to swallow, we may attain one object by the subcutaneous injection of apomorphine.

They are also of service in some forms of dyspepsia, and to clear the stomach in in-

3. The diaphragm descends and becomes fixed.

4. The glottis is closed so that the various muscles compressing the stomach act between two fixed points.

5. As vomiting cannot be effectually accomplished if the stomach is quite empty, under these circumstances the patient generally swallows a certain quantity of air, so as to distend the viscus.

1. *Action on the Brain and Nervous System.*—Emetics may cause some congestion of the brain by the obstructed venous return from the neck during the act of vomiting.

2. *Circulation and Respiration.*—They have a sedative action on the heart.

As the respiratory is close to the vomiting centre, the breathing generally becomes sighing and irregular during the act of vomiting; but in addition to this there is an increase of secretion from the pulmonary mucous membrane, and the compression of the lungs forces retained mucus out of the bronchial tubes.

3. *Organs of Secretion.*—By the pressure exerted on the intestines, some slight purgative action may result, and prolonged vomiting always leads to the discharge of bile from the stomach by

toxication, and for the relief of the convulsions of infancy, which often depend on irritating articles of diet.

The regular use of the stomach-pump at stated intervals has proved useful in cases of dilated stomach with sarcinous vomiting and serious digestive derangement.

1. We must therefore avoid their use in apoplectic cases.

2. Emetics are of great service in clearing the lungs in bronchitis, and in getting rid of the false membrane in croup and diphtheria, and they may thus be said to act as expectorants. We had here best use such emetics as ipecacuanha and tartarized antimony, which combine an expectorant action.

3. Emetics may therefore be said to act as cholagogues, and may be of great service in stimulating the action of the liver, and removing inspissated secretions from the gall-bladder. Some authori-

the mechanical squeezing of the liver and gall-bladder. Cutaneous emetics invariably cause free perspiration during their action, as well as an increased flow of saliva.

ties hold that it is good practice to give an emetic as early as possible at the outset of fevers, such as enteric; and it has been suggested that the fever poison is retained at this stage in the bile, and may be expelled along with it from the system.

EMMENAGOGUES AND ECBOLICS.

Of these we may consider, first,

ECBOLICS.

Physiological Action.

Ecbolics are substances which cause such violent contraction of the pregnant uterus as to effect the expulsion of its contents. It is not quite certain whether the principal members of the group act specially on the muscular structures of the organ, or whether a primary intervention of nervous influence through the spinal cord is necessary.

Therapeutical Action.

Ecbolics are used extensively in obstetric practice when it becomes necessary to stimulate the flagging powers of an exhausted uterus—the principal being ergot, digitalis, savin, borax, quinine. We are also compelled, under certain circumstances, to have recourse to the induction of premature labor, as when dangerous sickness goes on unchecked, or when weakened abdominal or thoracic viscera are injuriously compressed by the pregnant uterus. In such cases, however, it is generally found best to use mechanical means.

EMMENAGOGUES.

May be direct or indirect.

Physiological Action.

Direct emmenagogues act merely by restoring the nor-

Therapeutical Action.

Most of the ecbolic drugs act as emmenagogues when mal functions of the uterus when these are suspended.

given in small doses to a non-pregnant patient, and to the list we may add rue and cantharis. Of all these, however, ergot is by far the most effectual.

Indirect emmenagogues act by removing some constitutional condition which interferes with the due performance of the uterine functions. Thus amenorrhœa very frequently depends on anæmia, or constipation may require removal before our more special remedies will act, or there may be constriction of the os or atony of the uterus, or the spine may be at fault.

The different preparations of iron, in combination with aloetic or other purgatives, act well, and we may aid our chances of success by all hygienic means, as well as by warm hip-baths, leeches, placed preferably on the internal condyles of the femurs, and mustard stupes, at the normal menstrual periods.

EXPECTORANTS.

These are remedies which facilitate in various ways the expulsion of secretions from the bronchial tubes. They may thus be divided :—

1. The emetic class which are the most efficient of all, removing and softening the mucus, causing the transudation of watery fluids, and relaxing the muscular walls of the bronchial tubes.

1. There can be no doubt that, when the lungs are choked with secretion, a good emetic often acts like a charm, as in bronchitis, whooping-cough, etc.

We here use to best advantage the indirect emetic agents, as ammonium carbonas, ipecacuanha, etc.

2. Nauseants may also be of service as expectorants.

2. These are merely the indirect emetic drugs given in small doses, as antimony, ipecacuanha, etc.

3. We then have what are called the stimulating expec-

3. These are senega, ammonium carb., etc.; but it is evi-

torants, acting either on the general vascular system, or specially on the nervous and muscular structures of the lungs.	dent that any tonic or stimulating remedy may frequently act indirectly as an expectorant, by improving the tone of the circulation, and giving the patient strength to cough and clear his lungs. The stimulating expectorants are more especially used in the later stages of pulmonary disease.
4. Those remedies which promote secretion from a dry and swollen mucous membrane.	4. In the earlier stages of bronchitis much discomfort occurs from the dry hard cough and difficulty of breathing arising from swelling of the bronchial mucous lining. Great relief is experienced when free expectoration is established, and this may be promoted by inhalation of steam and the administration of liq. ammonii acet., lobelia, and the class of nauseants generally.
5. Expectoration is often rendered difficult by tenacity of the mucus, which is coughed up, only after much straining and effort, and great relief follows every drug which can thin or liquefy the secretion.	5. We find that alkalies act well here, and, if any gouty tendency exists, potassium iodide more especially.
6. Spasmodic contraction of the smaller bronchial tubes may interfere with free expectoration.	6. Here we may hope to obtain relief by the use of opium, belladonna, stramonium, tobacco, etc.

NARCOTICS AND ANODYNES.

Narcotics, as the name implies, are those remedies which cause sleep, and they do so by imitating the normal physiological arrangement of that condition, and producing an anæmic state of the cerebral hemispheres. Why they act in this selective way on the brain is not very clear; for although opium contracts the bloodvessels, thus arresting nearly all secretion, chloral has a dilating effect, and pot. bromid. has not been proved to have any special action on the circulation at all. Bernard's theory of independent vascular areas acted on by special drugs, only removes the difficulty further back, as, of course, we are totally unable to explain why one drug affects one region or function, and a different one another. But whatever the explanation may be, we all gratefully acknowledge the enormous benefits derived from the control over the reparative process of sleep which these remedies afford us, and a reasonable mode of division seems to be into —1st, direct narcotics; 2d, indirect narcotics. As a general rule we must exhaust all the resources of class 2 before we have recourse to class 1, remembering the fascination which these drugs exert and the pitiable condition of slavery to which they reduce their victims.

1. Direct Narcotics.

Physiological.

These are the following drugs, named in their order of potency, as opium, chloral hydrate, paraldehyde chloroform, potassium bromide, hyoscyamus, belladonna, hop, and Indian hemp. The peculiar action of chloral, however, occasionally causes its failure in cases of debility, where it acts by increasing the natural tendency of the relaxed arteries to dilate, thus flushing the brain with blood during recumbency, effectually preventing sleep.

We must also remember the depressing effect of chloral on the heart's action. In prescribing narcotics we must

Therapeutical.

Opium is, beyond doubt, the most potent and certain, and, perhaps, least dangerous narcotic; but the digestive disturbance unhappily following its use often interferes with its continued administration. It is, no doubt, best adapted of all the remedies of this class for use in fevers and in all painful conditions, on account of its anodyne properties. Chloral is more to be recommended in simple insomnia, in delirium tremens, and in all cases where we wish to keep up a prolonged narcotic effect, as it is not requisite, as a general rule, to increase the dose.

very carefully study the individual peculiarities of our patients, and prescribe our first dose of any member of the group with caution. Some people bear opium badly, and are furiously excited by doses which usually prove narcotic. Chloral sometimes causes faintness and nausea, bromide of potassium now and then fails of its effect, so that we require to feel our way with scientific timidity. Bromide of potassium is well adapted to soothe the system, when once excited by worry or over-work, and the others are occasionally useful when success has not been attained by other means.

2. Indirect Narcotics.

Physiological.

First on this list we must place those drugs which secondarily affect the brain circulation by toning up the arteries, and thus regulating the supply of blood. Digitalis is here all important; and iron, also, has its place, by improving the quality of the blood. A little alcohol, given at the right time, will often produce sleep; and it is well known that the state of exhaustion produced by an empty stomach will often lead to prolonged wakefulness, only to be removed by a little food. Tea and coffee taken late at night often prevent sleep.

Darkness and quiet, and warmth, promote slumber, and the opposite condition of cold is well known to cause a comatose condition, too often ending in death. Sleep, again, is promoted by

Therapeutical.

Digitalis often acts very efficiently, as a narcotic, by removing that relaxed condition of vessels which substitutes congestion for anæmia, when the patient lies down; a little alcohol at bed-time, more especially for the aged, is an excellent "night cap." When we find weakly persons complaining of want of sleep, we will do well to order a cup of milk or a little beef-tea, or other simple nourishment, to be taken at bed-time, or placed by the bed-side for use in the early morning hours, when the power of life begins to flag.

Suitable bed-room arrangements are very important, as some persons are at once awakened by the faintest ray of light. Some like a hard bed, others, a soft; according to their personal habits, and the removal of everything which excites the patient.

Thus, hyoscyamus or conia, or atropine, by stilling the wild ravings of mania, may be truly narcotic, and remedies of the next class are often effective members of the major group, by lulling or removing pain, which made sleep impossible.

we must carefully regulate the blanket coverings according to the season of the year. Cold feet often cause insomnia, and a hot-water bath will be found of service in winter; whilst an open window seems essential in some cases before sleep can be obtained.

Wakefulness may be the result of too low a pillow, the head being on the same plane as the body, and the blood encouraged by the flaccid vessels to flush the brain, and some persons have a superstitious feeling, which is probably worthy of encouragement, that the bed should invariably be placed north and south.

In some cases of sleeplessness cold to the head combined with a hot foot-bath has proved successful.

These drugs have done good service in asylum practice.

ANODYNES.

Physiological.

Anodynes act by lulling pain, probably by interfering with the conducting power of sensory nerves. Opium possesses this power, which is

Therapeutical.

Of all anodynes opium is the best, and more especially morphine by subcutaneous injection, which rarely fails to lessen, and often speedily

absent in chloral, and then we have aconite, belladonna, chloroform, compound spirits of æther, etc., which may soothe locally, as well as constitutionally.

removes pain; chloral only removes pain during sleep, but curare is probably a true [muscular] sedative. Local application of anodynes is only serviceable in acute inflammation, neuralgia, rheumatism.

PURGATIVES.

Purgatives may be divided, first, into two classes depending on their origin, and these are:—

1. The inorganic substances, comprising chiefly the mercurials and salines.

2. Those derived from the vegetable kingdom, and which depend for their therapeutical action on the presence of resins or oils.

Their actual modes of operation, however, are much more varied, and they will best be considered by division under various headings, according to their physiological and therapeutical properties.

1. *Laxatives.*—These substances act by causing a slight increase in the peristaltic movement of the intestines, with softening of the feces, which are then expelled in a solid and formed condition.

1. The principal of these are sulphur, castor-oil, magnesia, etc.; but in addition to actual drugs we may include various articles of diet, as oatmeal, brown bread, whole flour, figs, prunes, etc., which act purely mechanically.

Laxatives are useful whenever we desire a mild and unirritating effect, as in simple constipation from dyspepsia, pregnancy, or convalescence from acute diseases, sedentary habit, and other causes.

Castor-oil acts well in the early stages of diarrhœa, by sweeping away the irritating cause.

2. *Purgatives* produce more decided effects both in stimulating movement and secretion; but it is difficult to separate them entirely from either class No. 1 or No. 3.	2. Rhubarb, senna, aloes, and jalap are reckoned among the chief of these, and they are used in various dyspeptic conditions, rhubarb being more especially stomachic, and aloes emmenagogue, in its properties.
3. *Drastic Purgatives.*—These run by insensible gradations into the preceding class. Their action depends on an irritation of the mucous membrane of the intestines, and not only an actual increase of secretion from their glands, but the withdrawal of watery fluids from the blood. An overdose, therefore, may be attended by serious depression, discomfort, and even by death from inflammation of the bowels.	3. In this class we include jalap, scammony, colocynth, gamboge, and croton oil, and they are principally used either in obstinate constipation, or to produce a derivative or species of counter-irritant effects in various forms of brain disease.
4. *Hydragogue purgatives* cause very free secretion from the mucous membrane of the bowels, and empty the veins by withdrawing fluids from the blood.	4. These are elaterium, cream of tartar, etc., and they are most useful in ascites and other dropsical conditions, and for the relief of a feeble and laboring heart by diminishing the actual volume of the blood.
5. *Saline Purgatives.*—We shall, when treating of magnesium sulphate (Epsom salt), consider the action of this class, and point out how, from their low, diffusive power, they pass with difficulty into the blood, and how, whilst in the intestine, they not only absorb, retain, and carry away the watery fluids which they find in the intes-	5. Sulphate of magnesia and many of the salts of potash and soda must here be included. They are best given in a state of free dilution, and make very efficient habitual purgatives, more especially in the form of various natural purgative waters, such as Friedrichshall, Pullna [and Congress water].

tine, but also directly withdraw fresh supplies from the blood itself. Professor Matthew Hay, of Aberdeen, thus sums up an elaborate investigation lately made by him with the action of saline cathartics: "They cause no irritation or inflammation of the intestinal canal, nor stimulate in the smallest degree the secretion of the more important digestive juices, as the gastric, the pancreatic, and the biliary; have under ordinary circumstances little action on the blood, and mainly act by increasing the intestinal secretion and hindering the absorption of the intestinal fluid."

6. *Cholagogue Purgatives.* —Much experiment has recently been expended on the action of this class, and those recently conducted on improved principles by Prof. Rutherford have given us very precise and reliable indications for practice. Cholagogues have been held to act either by directly stimulating the secretion of bile, or by increasing the efficiency of the bile-expelling mechanism; and as the elaborate important experiments of Rutherford have only reference to the first action, he prefers to use the term hepatic stimulant. Although any explanation of the action of this class of remedies must

6. The principal members of this group are podophyllin, rhubarb, aloes, jalap, mercuric chloride [ammonium chloride], colchicum, euonymin, sanguinarin, ipecacuanha, colocynth, sodium sulphate, sodium benzoate, sodium salicylate. They are used for the relief of various functional affections of the liver, to remove what is commonly known as "biliousness," and to obviate portal congestion.

be almost purely conjectural, Rutherford believes that the effect is due to "a direct action of their molecules upon the hepatic cells or their nerves."

It is interesting to observe, as noted by Rutherford: *a.* "That when a substance produces purgation, but does not stimulate the liver, it diminishes the secretion of bile. *b.* That when a substance stimulates the liver as well as the intestinal glands, a moderate dose increases both the hepatic and the intestinal secretions, the effect on the former being more marked in the earlier part of the experiment, and diminishing as the purgative effect increases, but an excessive dose, by producing a violent purgative effect early in the experiment, may occasion nothing but diminished secretion of bile."

7. *Purgative Adjuvants.* In addition to drugs belonging to the actual purgative class, we have many indirect remedies which act with considerable efficiency. Thus we may use enemata, cold to the abdomen, mechanical kneading of the parietes, or electricity, in order to stimulate the muscular tissues to contraction; or we may cause a purgative action by relieving spasm.

7. Among the stimulating class we may mention strychnine, nux vomica, ergot, and the ferrous sulphate, and these are very efficient, in combination with mild purgatives, where constipation depends on a lax or weakened state of the intestinal walls.

When spasm or irregular contraction prevents free action of the bowels, we must have recourse to opium, belladonna, or the lead acetate, which, under these conditions, may be looked upon as true cathartics.

In administering purgatives, we must consider the various parts of the intestinal canal on which they act. Thus senna, jalap, etc., act on the small intestine, aloes on the large, podophyllin on the duodenum, etc. We must also consider the time of their administration, as we find that the slowly acting resinoid substances are best given at night or before dinner, whereas the salines are best taken on an empty stomach, and more especially before breakfast. The mode of administration is also worthy of note, the resinoids being best taken in the form of pill, whereas the salines act best in solution with free dilution and in combination with bitters, iron, or sulphuric acid. [In case it is desired to protect the stomach from the action of the drug, it may be given during digestion in gelatine capsule or in pills coated with keratin.]

STIMULANTS AND SEDATIVES.

Stimulants and sedatives are so directly antagonistic in nature that the most satisfactory scheme of their action will be presented by direct contrast in parallel columns, according to the plan adopted generally throughout these pages.

I. *General Stimulants.*

As the principal members of this group we may mention alcohol, opium, and the anæsthetic vapors, which, whilst stimulant in small, are narcotic in large doses; the ethers and ammonia, which are called diffusible because rapid elimination prevents any marked display of their stupefying qualities. We may refer to the article on Alcohol for directions as to the use of stimulants in

I. *General Sedatives.*

The stimulating drugs in the opposite column, when carried beyond a certain point, cause a sedative or soothing action, and run by insensible degrees into the truly narcotic class of remedies. Over-stimulation produces exhaustion and indirectly a sedative action.

[Galvanism may be applied so as to produce a sedative effect upon sensory nerves, and thus relieve pain.]

health and disease. Then again, the cold douche, counter-irritation, and electricity may act as powerful stimulating agents under certain conditions. [In narcotic poisoning, faradic or static electricity is of great value in maintaining the action of the heart and muscles of respiration.]

II. *Special Stimulants.*

1. *To the Nervous System.* Alcohol, ether, and opium undoubtedly stimulate the brain [by flushing it with blood, thus indirectly] causing greater intellectual activity and an increased flow of ideas, occasionally somewhat irregular in form. Phosphorus may be ranked under this heading, and digitalis may improve the functions of the cerebral hemispheres by the more regular supply of blood which its tonic influence on the arterial system provides.

The spinal cord is directly and powerfully stimulated by strychnine, and in the lower animals by morphine; whilst ergot and belladonna, by contracting its vessels, may help in removing various conditions of debility. Certain nervous centres are stimulated by certain drugs. Thus, atropine stimulates the respiratory centre, the indirect emetics stimulate the vomiting cen-

II. *Special Sedatives.*

1. *Nervous System.* The best sedatives to the brain are undoubtedly those drugs which diminish its blood supply and so cause sleep. Conium is held to exert a specially sedative effect on the great motor ganglia. [It is now generally held that the bromides and chloral cause anæmia of the cerebral centres, and thus favor physiological sleep.]

The principal spinal sedatives are Calabar bean, bromide of potassium, chloral, methyl conia, and gelsemium, which powerfully depress the reflex functions of the cord.

The respiratory centre is depressed by chloral hydrate, hydrocyanic acid, amyl nitrite, aconite, opium [alcohol], etc.

An interesting selective action of a sedative or paralyztre, strychnine the vasomotor centre, etc. The ear-ringing property of quinine is probably due to an irritative action on the auditory nerve, digitalis stimulates the vagus, whilst jaborandi and muscarin confine that action to the intra-cardiac inhibitory apparatus. The sialagogue action of jaborandi is believed to be due to a stimulation of the periphery of the salivary nerves.

2. *Cardiac and Vascular Stimulants.* The general stimulants already enumerated undoubtedly stimulate the heart, and the class of drugs of which digitalis is the type have been already considered under cardiac tonics. Opium is decidedly a vascular stimulant.

3. *Digestive and Secretory Stimulants.* The stomach may be stimulated by ginger, capsicum, pepper, and the like; whilst cholagogues, diuretics, purgatives, and diaphoretics may be held to stimulate the liver, kidneys, intestines, and skin, by promoting or exciting their respective functions.

ing nature is exerted by the following drugs on the following nerves. Atropine paralyzes the intra-cardiac inhibitory apparatus and the terminal fibres supplied by the third nerve to the iris. Conium paralyzes the third nerve, gelsemium the sixth, and croton chloral the fifth. Atropine also exerts an inhibiting influence upon the secretory nerves of the submaxillary gland etc.

2. *Cardiac Sedatives.* The principal cardiac sedatives or depressants are aconite [veratrum viride], tobacco, colchicum, chloral, chloroform, and potassium nitrate.

3. *Digestive and Secretory Sedatives.* A sedative action on the stomach may be produced by hydrocyanic acid, bismuth, alkalies, arsenic and silver, generally in small doses; whilst counter-irritation over the epigastric region is often an effectual means for the relief of pain.

TONICS.

The word tonic is undoubtedly vague from the strictly scientific stand-point, but we may congratulate ourselves that zeal for more precise nomenclature has not yet succeeded in depriving us of a term which has now included so many associations of an empirical kind. The best example of tone probably is the gentle and permanent contraction of the muscular tissue, which is kept up in the healthy body by the central nervous system, and which, when suspended by disease, is familiar to us all in the flaccid and powerless limb of paralysis, and an appropriate remedy is found in electricity, which improves the nutrition and status of the part. We have vascular tone also, in which the due calibre of the arteries is regulated by the action of the vaso-motor nerves, and were we asked to name two tonic remedies, which reinforce these important functions, we might unhesitatingly point to strychnine, which aids the nervous tone, and digitalis, which raises the arterial tension by stimulating the vaso-motor centre.

But treating our heading in a more general sense, we are justified in calling anything a tonic which improves the general health, and thus an emetic, or a purgative, or a narcotic, or a sedative, may really have tonic properties by removing obstruction or irritation and giving rest to fatigued or worn-out organs. The best of all tonics, after all, are those which cannot well be included in any therapeutical tables; for what can equal the bracing properties of sea-bathing, of change of air and scene, of the keen whiff of exhilarating ozone on a Swiss glacier or a Scotch moor, of a day's hunting or shooting, or a ramble along a good trout stream when fish are well on the take? A good dinner, with a glass of good wine, cheerful society, the stimulus of hope, even the rousing effect of a sudden reverse of fortune, may be often more successful than mere drugs; but in considering the varying modes of treatment for debility in its many forms, we may usefully divide our therapeutic resources in the following way:—

I. Nervine Tonics.

Physiological.	*Therapeutical.*
1. First among these we may rank agents acting directly on the brain, reducing its blood supply and giving it rest. [Allaying its excitability and favoring normal nutrition.]	1. Under certain conditions of mental excitement or worry or debility, no tonic can be so good as a sound night's rest, and the narcotic class of remedies act well by supplying this.

2. Then, again, certain drugs act on special centres; thus, strychnine and digitalis stimulate the vaso-motor centre, atropine the respiratory centre; and strychnine stimulates the spinal cord.

Finally, we have those substances generally known under the somewhat vague title of nervine tonics. These are principally metals, such as arsenic, phosphorus, zinc oxide, and zinc sulphate: but quinine and ammonium chloride have also good right to be included in the list.

2. Strychnine and nux vomica are of great service by aiding the circulation through the vaso-motor centre, and helping the spinal cord to resume its full functions when it is weakened by any debilitating cause. The nervine tonics are used not only in simple debility, but in special conditions of nervous weakness. Thus quinine, arsenic, and even ammonium chloride are of service in neuralgia, probably by giving increased tone to sensory nerves; the zinc salts are useful in the irregular muscular contractions of chorea, and in the loss of the presiding nervous control which characterizes hysteria.

II. Vascular Tonics.

This class of remedies may act in three different ways.

1. On the heart itself, bracing up and improving the condition of tone of its muscular fibre and slowing its action so as to give it increased rest. Digitalis stands first on the list. [Strychnine is a valuable cardiac tonic, so also are sparteine sulphate strophanthus, etc.]

1. We see the great benefit of this division more especially in heart disease, where the pulse is feeble and irregular, and in functional derangement of cardiac action from feebleness of the muscular structures of the heart.

2. Those which act more particularly on the vessels, raising arterial tension by contracting the muscular tissue of which their walls are largely composed. Here again digitalis comes into play, but

2. These also act well in improving the general tone of local circulation, bracing up the vessels, and removing œdema and passive congestion.

we also have ergot, belladonna, etc. etc.

3. Those which act directly on the blood, increasing the number of red corpuscles and the amount of hæmoglobin which they contain. Iron [manganese], phosphorus, arsenic, and cod-liver oil have been proved, by careful investigations and by direct measurement, to have this property [which has also been shown by Keyes to belong to mercuric bichloride given in small doses.]

3. In anæmia, where the blood is poor in red corpuscles and hæmoglobin, in chlorosis, in the debility following loss of blood, etc. etc., these hæmatinic remedies, as they have been called, are of essential service, whilst in neuralgia they act well by giving the enfeebled sensory nerves the healthy stimulus of better blood.

III. Digestive Tonics.

Of the importance of this division there can be no doubt, when we consider that life itself, as well as sound health, depend on the consumption and due assimilation of a well-arranged dietary. Bitters are generally looked upon as the type of tonics, and there is no doubt that they increase the feeling of appetite and augment the secretion of saliva, and possibly that of the gastric juice.

Then, again, the best tonic to an irritable stomach may be remedies such as bismuth and hydrocyanic acid, which calm and soothe, and enable the mucous membrane to resume its function. Gentle purgatives may also act as tonics, and acids and alkalies, which both check inordinate acid secretion and encourage its flow.

In general debility and feebleness, convalescence from acute illness, and want of tone, we know how much more hopeful we become when our patient is able to relish and digest his food, and we also know how great is the aid given by small doses of alcohol with the meals, in helping the weak stomach to do its work. For irritable dyspepsia, with a red tongue, the ordinary tonics only do harm, and when the tongue is foul and loaded, a mild course of purgative will remove unhealthy mucus and enable digestion to be satisfactorily accomplished.

[SUMMARY OF THE ACTION OF THERAPEUTIC AGENTS.

Remedies may be used with a therapeutic effect for the purpose of favorably modifying :—

Environment	(Antiseptics, and hygienic measures).	
Nutrition	Food. Appetite. Digestion. Absorption. Secretion. Blood-crasis. Respiration. Bodily heat. Organic status.	
Innervation	Sensation (general and special). Motility. Condition of nervous structure.	
Circulation	Action of heart Arterial contraction. Volume of blood.	Stimulant. Sedative.
Functional activity (specifically).	Stomach. Liver. Kidneys. Heart. Lungs. Nervous structures, etc.	Vomiting. Purging. Counter-irritation, etc.

They also indirectly influence development, and in an unknown manner act upon certain morbid states, as cinchona in malaria, and mercury in syphilitic dyscrasia.

The following classification (that of Dr. H. C. Wood) appears to be more scientifically arranged than any other that has been offered :—

CLINICO-PHYSIOLOGICAL CLASSIFICATION OF DRUGS.[1]

A.—EXTRANEOUS OR NON-SYSTEMIC REMEDIES.

Family I.—ANTACIDS. Liq. Potassæ; Sodium and its salts; Lime-salts and preparations.

Family II.—ANTHELMINTICS. Spigelia; Azedarach; Chenopodium; Brayera; Santonica; Aspidium; Pepo; Oleum Terebinthinæ; Granatum; Thymol; Kamala.

Family III.—DIGESTANTS. Pepsinum Saccharatum; Extractum Malti; Acidum Hydrochloricum.

Family IV.—ABSORBENTS. Carbo Animalis Purificatus; Carbo Ligni.

Family V.—DISINFECTANTS. Hydrargyrum Chloridum Corrosivum; Acidum Carbolicum; Potassii Permanganas; Aqua Chlori; Calx Chlorata; Liq. Sodæ Chloratæ; Ferri Sulphas; Plumbi Nitras; Sodii Boras; Acidum Boricum; Acidum Sulphurosum.

B.—SYSTEMIC REMEDIES.

CLASS I.—GENERAL REMEDIES.

Order I.—NERVINES.

Family I.—ANTISPASMODICS. Asafœtida; Camphora; Camphora Monobromata; Humulus; Lupulinum; Moschus; Spiritus Ætheris Compositus.

Family II.—ANÆSTHETICS. Æther; Chloroform; Nitrogen Monoxide.

Family III.—SOMNIFACIENTS (HYPNOTICS). Opium and its Preparations; Chloral; Lactucarium; Acidum Hydrobromicum; Bromides.

Family IV.—CEREBRAL EXCITANTS (Delirifacients). Atropinæ Sulphas; Belladonna Preparations; Cannabis Indica and Americana; Stramonium; Hyoscyamus; Erythroxylon.

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[1] [In considering the remedies systematically in this work, it has been thought best not to follow any therapeutical classification, as none that have been offered are free from objection, and the advantages of an alphabetical arrangement for the convenience of reference are too obvious to demand discussion.]

Family V.—Excito-Motors. Nux Vomica, Strychnina.

Family VI.—Depresso-Motors. Acidum Hydrobromicum and Bromides; Amyl Nitris; Potassii Nitras; Physostigminæ Salicylas; Lobelia; Gelsemium; Tabacum; Conium.

Order II.—Cardiants.

Family I.—Cardiac Stimulants. Alcohol; Ammonium Preparations; Digitalis; Caffeine; Scoparius (Sparteine Sulphas).

Family II.—Cardiac Depressants. Aconitum, Veratrum Viride; Antimonium salts; Arnicæ Flores; Arnicæ Radix; Acidum Hydrocyanicum; Vegetable acids; Veratrina.

Order III.—Nutrients.

Family I.—Astringents. Acidum Gallicum; Acidum Tannicum; Rosa Centifolia; Rosa Gallica; Geranium; Rhus Glabra; Salts of Argentum; Aluminium; Bismuthum; Cuprum; Cerium; Zincum.

Family II.—Tonics. Ferrum; Manganese; Phosphorus; Zinci Phosphidum; Mineral acids.

Family III.—Alteratives. Arsenium preparations; Hydrargyrum salts; Oleum Morrhuæ; Acidum Phosphoricum; Colchici Semen; Colchici Radix; Sarsaparilla; Guaiac; Preparations and Salts containing Iodum.

Family IV.—Antiperiodics. Cinchona; Eucalyptus; Acidi Arseniosi.

Family V.—Antipyretics. Acidum Carbolicum; Acidum Salicylicum; Quinina; Oleum Gaultheriæ.

Class II.—LOCAL REMEDIES.

Family I.—Stomachics. Pimenta; Gentiana; Calumbo; Cardamomum; Capsicum; Piper; Myristica; Macis; Quassia; Cinnamomum; Oleum Caryophylli; Zingiber.

Family II.—Emetics. Ipecacuanha; Apomorphinæ Hydrochloras; Sinapis; Zinci Sulphas; Cupri Sulphas.

Family III.—CATHARTICS. Aloes, Rheum, Senna, Jalapa; Colocynthis, Scammonium; Cambogia; Podophyllum; Elaterium; Oleum Tiglii; Frangula; Cassia Fistula; Manna; Tamarindus; Euonymus; Iris; Magnesii Sulphas; Magnesii Citras; Sodii Phosphas; Magnesii Carbonas; Potassii et Sodii Tartras.

Family IV.—DIURETICS. Scilla; Scoparius; Spiritus Ætheris Nitrosi; Caffeina; Buchu; Uva Ursi; Juniperus; Chimaphila; Oleum Erigerontis; Oleum Santala; Terebinthina; Copaiba; Cubeba; Cantharis.

Family V.—DIAPHORETICS. Pilocarpus; Alcohol; Liquor Ammonii Acetatis; Spiritus Ætheris Nitrosi; Pulvis Ipecacuanhæ et Opii.

Family VI.—EXPECTORANTS. Ipecacuanha; Lobelia; Antimonii et Potassii Tartras; Grindelia; Senega; Ammoniac; Tolu; Allium; Scilla; Eucalyptus; Ammonii Chloridum; Ammonium Carbonas.

Family VII.—EMMENAGOGUES. Myrrha; Oleum Sabina; Oleum Rutæ; Cantharides; Oleum Tanaceti.

Family VIII.—OXYTOCICS. Ergota; Gossypii Radicis Cortex; Quinina; Ustilago.

Family IX.—SIALAGOGUES. Pellitory; Pilocarpus.

Family X.—ERRHINES. Cubeba.

Family XI.—EPISPASTICS. Ceratum Cantharidis; Collodium cum Cantharide.

Family XII.—RUBEFACIENTS. Capsicum; Oleum Sinapis volatile; Oleum terebinthinæ; Aqua Ammoniæ; Pix Burgundica; Pix Canadensis.

Family XIII.—ESCHAROTICS. Potassa; Acidum Arseniosum; Liquor Hydrargyri Nitratis; Acidum Chromicum; Acidum Aceticum, etc.

Family XIV.—DEMULCENTS. Acacia; Linum; Ulmus.

Family XV.—EMOLLIENTS. Oleum Theobromæ; Adeps; Petrolatum.

Family XVI.—DILUENTS. Aqua.

Family XVII.—PROTECTIVES. Collodium; Liquor Gutta Perchæ; Emplastrum Saponis.

DRUGS AND PREPARATIONS

OFFICINAL IN

THE UNITED STATES PHARMACOPŒIA.

ABSINTHIUM—WORMWOOD.

[*The leaves and tops of Artemisia Absinthium, Linné* (*N. O. Compositæ*).

Wormwood is one of the ingredients of Vinum Aromaticum, U. S. P. (Lavender, Origanum, Peppermint, Rosemary, Sage, Wormwood āā one part, Stronger white wine q. s. ad 100 parts.) It is a stimulating dressing for venereal ulcers. It may be used internally as a bitter tonic, dose ʒj to ℥j (4 to 32 G.).]

Wormwood was formerly used as a bitter tonic and anthelmintic, but it has now quite disappeared from practice. Its prolonged use as a beverage, in the form of liquor, has been shown to produce a condition of enfeeblement and irritability of the nervous system, with a tendency to epileptiform convulsions.

[In combination with other herbs, it is occasionally used in domestic practice in the form of infusion under the name of German Tea as a stomachic ; and sometimes for intestinal worms in children. Dose from fifteen to forty grains (1 to 2.5 G.), preferably in infusion or decoction (1 to 16). Its tonic effects are due to a bitter principle, absinthin. The plant also contains a volatile oil, which is a narcotic poison, producing insensibility, convulsions, and coma ; and the use of absinthe as an intoxicating drink causes epilepsy and depression of the vital powers.]

[ABSTRACTA—ABSTRACTS.

This class of preparations has been added to the officinal list in order to atone for the uncertainty of strength of the ordinary commercial solid extracts, by furnishing in a powdered form preparations which bear a definite relation to the crude drug. While the fluid extracts represent the virtues of the drugs, minim for grain (or more correctly ccm. for gramme), the abstracts represent twice the strength of the crude drug (200 per cent.). They are prepared by exhausting the drug with a menstruum which dissolves the active principles, then evaporating the extract thus obtained, and adding enough sugar of milk, with trituration, to make the product one-half the weight of the original drug. The powder should be preserved in a well-stopped bottle. The officinal abstracts are—

Abstractum	Aconiti	usual dose	gr. 1/6 to ij	(.01 to .12 G.)
"	Belladonnæ	"	gr. ½ to iij	(.03 to .20 G.)
"	Conii	"	gr. v to viii	(.30 to .50 G.)
"	Digitalis	"	gr. ½ to j	(.03 to .06 G.)
"	Hyoscyami	"	gr. iij to v	(.20 to .30 G.)
"	Ignatiæ	"	gr. j	(.06 G.)
"	Jalapæ	"	gr. viii to x	(.45 to .65 G.)
"	Nucis Vomicæ	"	gr. ½ to ij	(.03 to .15 G.)
"	Podophylli	"	gr. v to x	(.30 to .65 G.)
"	Senegæ	"	gr. v to x	(.30 to .65 G.)
"	Valerianæ	"	gr. xv to xlv	(1. to .3 G.)]

ACACIA—GUM ARABIC.

[*A gummy exudation from Acacia verek and other species of Acacia.*
(*N. O. Leguminosæ, Mimoseæ.*)

OFFICINAL PREPARATIONS, U. S.

Mucilago Acaciæ (Acacia, 34 parts; Water, 66), used as a vehicle.

Syrupus Acaciæ (Mucilage, 25 parts; Syrup, 75), used as a vehicle.

Also enters into Mistura Amygdalæ, Pulvis Cretæ Compositus, Mistura Cretæ, and Mistura Glycyrrhizæ Composita, and is used as an excipient and dusting-powder for pills.]

Gum is demulcent, and in the form of mucilage is much used for the suspension of bulky and insoluble powders, as well as to prevent the precipitation of the resin, which ensues when such substances as tincture of myrrh, tinct. cannabis Indicæ, etc., are added to water [and also to make emulsions of oil and water].

[Gum-Arabic solution, made thin and flavored to taste, may be given as a drink in *fevers*, in *angina*, in *gastro-enteric inflammation* and *dysentery*. The trochees are popular confections and are useful in pharyngeal irritation. It is believed to have some nutritive value.]

[ACETA—VINEGARS.

The officinal vinegars are :—

Acetum Lobeliæ,	Acetum Sanguinariæ,
Acetum Opii,	Acetum Scillæ.

ACIDUM ACETICUM GLACIALE—GLACIAL ACETIC ACID.

Nearly, or quite, absolute acetic acid, U. S. P.

ACIDUM ACETICUM—ACETIC ACID.

[*A liquid composed of* 36 *per cent. of absolute acetic acid and* 64 *per cent. of water. Sp. grav.* 1.048.

Acidum Aceticum Dilutum. Acetic acid 17, water 83, contains 6 per cent. of absolute acetic acid. Used in preparing the Aceta.

Also enters into Emplastrum Ammoniaci, Emp. Ammoniaci cum Hydrargyro, Extractum Colchici Radicis, Mistura Ferri et Ammonii Acetatis, Liquor Ammonii Acetatis, Syrupus Allii, and Syrupus Scillæ.

Poisoning and Antidotes.

When acetic acid is swallowed there is experienced great heat and burning pain in the stomach, vomiting of sour liquid, purging, convulsions, terminating finally in coma and death. At the autopsy the mouth and fauces are found to be brownish, lingual papillæ swollen, with sloughing of mucous membrane of pharynx. The stomach is livid or blackened, and its capillaries injected.

In poisoning by acetic acid, alkalies or their carbonates may be given, properly diluted, and vomiting encouraged by large draughts of warm water containing milk or soap.]

External Action.

Strong, or glacial, acetic acid is a favorite and very successful application to *warty growths*, whether of venereal origin or not. The little tumor is touched several times with a glass rod, or brush, or a piece of wood, dipped in the acid, care being taken that none of the fluid trickles down over the neighboring structures. A few repetitions of this process will generally prove effectual. [It has been used with success for nasal hypertrophies, and for injection into nasal polypi.] It is also topically used in some obstinate forms of *skin-disease*, and more especially the varieties of tinea comprised under the term *ring-worm*. The acid probably acts by directly attacking and destroying the parasitic growth on which the troublesome affections depend. Acetic acid is also occasionally applied to *corns*.

INTERNAL USE.

Acetic acid is seldom used internally, although it forms an agreeable and effectual remedy for the checking of *night sweats*, and Graves used thus to prescribe it.

Vinegar, the strength of which corresponds pretty accurately with the dilute acid, is purely a domestic remedy for headache, hysteria, and other allied conditions.

[Vinegar, more or less diluted, is a favorite domestic application in *head-ache*, *sprains*, or *bruises*, and *sun-burn*; it is also used as a clyster against *ascarides*. It may be given as a gargle for tonsillitis, and a refrigerant drink in *fevers;* and in these cases it is frequently applied to the surface of the body, with a sponge, as a means of reducing a high temperature. In small amounts vinegar aids digestion, but in excess it is said to produce degeneration of the gastric tubules and fibroid thickening of the stomach. It is supposed to reduce the proportion of fibrin in the blood. It has been pronounced to be an efficient remedy in *scurvy*, in combination with nitre (℥j to Oj), of which an ounce may be given four times daily. As an antidote to caustic alkalies, vinegar is the most covenient form of acid to give, as it is found in every house. It can be freely administered, diluted with water, without fear of bad results.

The formula for *Linimentum Terebinthinæ Aceticum* (N. F.), a popular liniment for *chronic rheumatism*, will be found at the end of the book, in the Formulary of the American Pharmaceutical Association.]

ACIDUM ARSENIOSUM—ARSENIOUS ACID
(As_2O_3; 197.8.).

[OFFICINAL PREPARATIONS, U. S.

Liquor Acidi Arseniosi (one per cent.). Dose, ♏iij to x (.20 to .60 Gm.).

Arsenii Iodidum. Dose, gr. $\frac{1}{20}$ (.003 Gm.).

Liquor Arsenii et Hydrargyri Iodidi (contains iodide of arsenic, mercury biniodide, of each, one part in one hundred). Donovan's solution. Dose, ♏iij to x (.20 to .60 Gm.).

Liquor Potassii Arsenitis. (One per cent. of arsenious acid in combination.) Fowler's solution. Dose, ♏iij to x (.20 to .60 Gm.).

Sodii Arsenias. Dose, gr. $\frac{1}{12}$ (.005 Gm.).

Liquor Sodii Arseniatis. (Sodii arsenias one per cent.) Pearson's solution. Dose, ♏v (.30 Gm.).

Metallic arsenic is inert, and is not used in medicine. Arsenious acid is sometimes termed white arsenic, or, simply, arsenic, as in the following remarks. It is a corrosive poison.]

POISONOUS EFFECTS AND ANTIDOTES.

Poisoning by arsenic is ushered in by [a metallic taste in the mouth, salivation, nausea, fainting, great thirst, and a burning pain in the stomach, vomiting and diarrhœa. The stools are dark colored and very offensive, the urine scanty and high colored. The pulse is weak, and often intermits; there is distressing palpitation of the heart, with labored respiration and cold sweats. There is prostration, sometimes paralysis, and] headache, fever, and disturbed sleep, followed by more acute symptoms and death from collapse—a train of symptoms much resembling those met with in cases of true cholera. [Such phenomena occurring in the absence of any epidemic of Asiatic cholera, and coming on soon after eating, in a previously healthy person, should excite suspicion of arsenical poisoning.]

After death, there will be the usual pathological appearance of gastro-enteritis [but without erosion or abrasion, and most marked in the stomach, duodenum, and the rectum. Sometimes there are few or no morbid appearances in these situations; for instance, where it has been administered in a vaginal injection. In some cases the gastro-enteric symptoms are not prominent, or are entirely absent, and the patient is found to have marked depression of the vital powers, and a progressive tendency to coma and collapse, showing that the force of the poison has been chiefly expended upon the nervous system. Recent researches have shown by chemical analysis a relatively larger proportion of arsenic in the nervous centres than in other tissues of the body.] Frequently we find fatty degeneration of the heart and muscles, and parenchymatous degeneration of the liver, kidneys, etc. [Arsenic may generally be detected in the liver, or contents of the stomach, by Reinsch's or Marsh's test.

The chemical antidotes to arsenious acid are freshly prepared hydrated sesquioxide of iron, and magnesia freshly calcined. The solution of dialyzed iron is a convenient antidote for arsenical poisoning. When Fowler's solution has been taken the ferric salts are the antidotes.

We should resort to abundant draughts of sweet milk, gruel, decoctions of starch, or oily mixtures; tickling the fauces, etc., to induce vomiting; the stomach-pump; emetics of sulphate of zinc. Hydrated sesquioxide of iron, newly prepared, in large doses, or in the form of dialyzed iron, affords the only reliable antidote. The officinal hydrated oxide of iron with magnesia is ordered to be prepared by adding gradually water containing magnesia, 150 grains, to solution of tersulphate of iron, 1000 grains, shaking them together until a homogeneous mass results. The solutions are to be kept on hand ready for immediate use.

Calcined magnesia may be used with advantage, until hydrated peroxide of iron can be procured. Having removed the poison by vomiting and purging, we afterwards combat any inflammatory symptoms by the usual means, and let the patient subsist, for a long time, wholly on the blandest diet.

TESTS FOR ARSENIC.

In the solid state it can be sublimed by heat. If mixed with charcoal, and heated in a suitable test-tube, deoxidated arsenic will be obtained in the form of a metallic coating inside the tube; and this may be reconverted into arsenious acid by urging it in various directions along the tube with the aid of a minute spirit-lamp flame; the facets of the crystals thus formed (on the cooler situations) will be seen in some places with the unassisted eye, but more distinctly by means of a four-power lens.

In solution, ammoniacal nitrate of silver produces a lemon-colored (*arsenite of silver*) precipitate. Ammoniacal sulphate of copper throws down a grass-green (*arsenite of copper*) precipitate. Transmission of sulphuretted hydrogen produces a bright-yellow (*sulphide of arsenic*) precipitate. Lime-water precipitates a white (*arsenide of calcium*) powder, but this test is not one to be relied upon.

Marsh's Test.—Placed with zinc and diluted sulphuric acid in the hydrogen apparatus, the arseniuretted hydrogen thence arising, when lighted, will deposit metallic arsenic on a piece of glass held within the flame.

Reinsch's Test. — Acidulate the suspected liquid with muriatic acid, and boil copper wire, or foil, in it for ten minutes. The arsenic is deposited on the copper as a white alloy, from which it can be separated as arsenious acid, by subjecting the copper, cut into shreds, to a low red heat in the bottom of a small glass tube.

The precipitates referred to, if washed and dried, may be treated as directed above for arsenic in the dry or solid condition.

In testing suspected matters obtained from the stomach, these, and in cases of death, the viscera themselves, must be cut or broken up, and boiled during, at least, three-quarters of an hour; if not sufficiently fluid, add distilled water. Strain, add a small quantity of potassa, and again boil during a quarter of an hour and filter. If this liquor manifest either alkaline or acid reaction, neutralize with potassa, or with acetic acid, as may be required; then acidulate it faintly with hydrochloric acid. The liquor may now be experimented on with the above tests.]

LOCAL ACTION.

Physiological.

Externally applied, arsenic causes redness and inflammation of the skin, followed by ulceration and sloughing. If we wish to use it as a caustic we must apply it freely to prevent bad results, remem-

Therapeutical.

Arsenic has been employed as a caustic in *cancer* and allied diseases; but not only is its action difficult to regulate, but dangerous symptoms of poisoning have resulted from the very ready way in bering that if we produce inflammation of a part we check its absorptive powers. [It is considered safer to limit the application to a small surface at a time on this account.]

which it is absorbed by the skin. As a more gentle form of stimulant, however, it is of great service in some chronic skin diseases, such as lupus.

INTERNAL ACTIONS AND USES.

I. *On Brain and Nervous System.*—Arsenic has a tonic influence on the nervous system generally.

I. This may in some measure explain its antiperiodic properties, for it is well known that arsenic is only second to quinine in its power of arresting the various manifestations of *ague*.

It is also a valuable remedy in *neuralgia*, and *chorea* may frequently be cured by full doses.

II. *Circulation and Respiration.* — In small doses arsenic may stimulate cardiac action in a slight degree; and the experience of the arsenic-eaters of Styria shows that its use improves their wind, and enables them to undergo great exertion without fatigue. This fact, which was formerly denied, has been placed beyond all doubt by the observations of Maclagan, who, after seeing an arsenic-eater consume his dose, detected the presence of the metal in the urine. Either arsenious acid or orpiment is used, and the largest dose is said to be 14 grains, 8 grains having been actually eaten in presence of a competent witness. It is stated,

II. Arsenic is of service in *asthma*, *hay-asthma*, perhaps by calming irritability of the vagus, and some forms of *chronic bronchitis* and *chronic phthisis*, and has been found to act well by the inhalation of spray.

The Monté Doré waters, so much recommended in asthma, are believed to owe their efficacy to the arsenic which they contain.

however, that only persons of strong constitution can bear this habit.

III. *On the Secreting Organs.* — 1. *Digestive Tract.* In small doses arsenic stimulates the appetite and increases the digestive powers, but if used more freely symptoms of irritation set in, which may terminate in gastro-enteritis. [Some patients cannot take the smallest doses without great systemic disturbance. It is advisable to begin with minute doses and cautiously increase, watching the effect.]

III. Ringer recommends small doses of arsenic—1. In a form of *irritative dyspepsia* with red tongue and prominent papillæ, in the morning *vomiting* of drunkards, and in that variety of *diarrhœa* which leads to the evacuation of the bowels immediately after eating. That the nutrition of the skin is profoundly affected by arsenic, is proved by experiments which show that desquamation of the epidermis, and degeneration and partial solution of the protoplasm of the cells of the cutis vera, resulted in frogs poisoned with the drug. We may explain the success of arsenic in cutaneous disorders either by its influence on the nutrition of the cell-growth of the skin, or by its action on the nervous system, it being an undoubted fact that its curative powers are almost restricted to those diseases which are of neurotic origin. Excellent though its effects frequently are, it will often prove disappointing, and will fail to cure the disease for which it is given. But in psoriasis, if we get the case early, and treat it regularly and rigidly, continuing the administration of the drug in small doses for some time after the eruption has disappeared, we may usually hope for good results, remembering that relapses are extremely common in this disease. Some authorities hold that in order to get full value from the use of arsenic, we must produce physiological symptoms, but my own experience is entirely opposed to this.

2. *Cutaneous.* — Arsenic occasionally causes irritation and tingling of the skin, and even the appearance of eczematous and occasionally herpetic eruptions.

2. In dry scaly affections of the skin, such as *psoriasis*, in the dry stages of *eczema* and *impetigo*, in *pemphigus*, and in *lichen*, arsenic acts most admirably; but we must be careful never to give it during the acute stage of any skin affection, as in these circumstances, it is invariably found to aggravate the symptoms. Arsenic is much valued by Balfour and others in *chronic rheumatism*, and more especially *rheumatoid arthritis*.

3. *Liver.*—Arsenic in poisonous quantities causes, like phosphorus, fatty or parenchymatous degeneration of the liver.

3. [Arsenic in small doses is a valuable stimulant to the hepatic tissue changes, and is useful in incipient *cirrhosis* and in certain forms of *intestinal indigestion.*]

4. *On Urine.* — Nothing special has been described [except that the kidneys and liver are the principal channels for the discharge of the poison from the circulation.]

4. Dr. Lauder Brunton records an interesting case in which arsenic cured albuminuria in a young man, due probably to imperfect pancreatic digestion of albumen.

MODE OF EXAMINATION.

Arsenic is rather slowly removed from the body by the intestines, the urine, and perhaps the bile and the skin. Traces have been found in the urine sixteen days after ingestion.

MODE OF ADMINISTRATION, CAUTIONS, ETC.

Persons vary much in their susceptibility to arsenic, and we must invariably begin its use with caution, keeping in mind that children bear it well, and that a child of five can bear with impunity as large a dose as an adult. [Two grains of arsenious acid have caused death, according to Dr. Taylor.]

We must also remember that, although the Styrian peasants can accustom themselves to large and increasing doses, the experience of medical practice shows that, after a certain time, patients taking this drug are liable to show some of the following symptoms: Smarting and itching about the conjunctivæ, with œdema, pain in the stomach, vomiting and diarrhœa, white tongue, and general digestive derangement; and when these indications of "accumulation" occur, it is not necessary to suspend the remedy altogether, but merely to diminish the dose.

The probabilities of these unpleasant symptoms are much lessened, however, by advising that the dose should always be taken after a meal.

The mode in which arsenic is usually given is in the form of liq. arsenicalis [Fowler's solution—Liq. Potass. Arsenitis, U. S.], which is merely a solution of arsenious acid in carbonate of potash flavored with sp. lavend. co., containing gr. ss in f℥j, and of which the dose is, as a general rule, from ♏ij to ♏v (.13 to .32 Gm.); but in some obstinate affections, like chronic rheumatic arthritis, it is requisite to push the quantity as far as ♏x or even ♏xv (.65 to 1. Gm.). In skin diseases I am strongly in favor of beginning with a large dose, and pushing the drug vigorously. Small doses seem more likely to provoke irritation than large. Being almost tasteless, liq. arsenicalis is best given simply in water.

The liquor arsenici chloridi, sodii arsenias, and ferri arsenias are rarely used; and the liquor arsenici et hydrargyri iodidi [Donovan's Solution], which was supposed to have a special influence over syphilitic skin diseases on account of its combination of arsenic with iodine and mercury, has gone much out of fashion in these days. Dose, 10 to 30 minims (.65 to 2. Gm.). [The iodide of arsenic is sometimes used as an ointment in skin affections (gr. iij to ℥j). Simple ointment with arsenious acid (gr. j to ℥j) has been highly recommended as an agreeable substitute for sulphur ointment in the treatment of *scabies.*]

℞.	Hydrargyri chloridi corrosivi	ʒiiss	or	10		Gm.	
	Hydrargyri sulphidi rubri	gr. xl	"	2	60	"	
	Acidi arseniosi	ʒj	"	4		"	M.

S. To be made into a paste with a little water, and then applied with a brush.

Useful in cases of lupus.

℞.	Vini ferri	fʒj	or	4		Gm.
	Liquoris potassii arsenitis	♏iij	"		20	"
	Syrupi aurantii	fʒj	"	4		"
	Aquæ anethi	q. s. ad f℥j	"	32		"

Pro dosi.

Useful in eczema, psoriasis, etc.

[ACIDUM BENZOICUM—BENZOIC ACID ($HC_7H_5O_2$; 122).

In white lustrous scales or friable needles, soluble in 500 parts of cold water, or 3 parts of alcohol and in 15 parts of boiling water, or 1 part of alcohol. Dose, gr. x–xxx (0.65–2 *Gm.*).

(See BENZOINUM.)]

[ACIDUM BORICUM—BORIC ACID (BORACIC ACID, PH., 1870) (H_3BO_3; 62).

Transparent, colorless, six-sided plates, soluble in 25 parts of water and 15 parts of alcohol at 59° *F., and in three parts boiling water or 5 parts boiling alcohol. The alcoholic solution burns with a flame tinged with green. Dose, gr. v–xx* (0.30–1.30 *Gm.*).

OFFICINAL SALTS.

Sodii Boras—Borate of Sodium (Borax) gr. v–xxx (.30–2 Gm.).]

Boric acid may be obtained by the decomposition of borax by sulphuric acid. It occurs in white, shining, scaly crystals, with no smell, and a feeble acid taste. Dissolved in alcohol, it imparts a characteristic green tinge to its flame; it is soluble, also, though to a less extent, in water (20 parts cold, or in 3 of hot). Borax, but to a higher degree, boric acid has decided antiseptic power, arresting fermentation and putrefaction by destroying the organic ferments upon which their processes depend.] This is an excellent antiseptic application to superficial granulating surfaces, used as a lotion, 40 per cent. saturating water, or as boric lint, made by soaking lint in a hot 30 per cent. solution, and allowing it to dry, or an ointment: Boric acid and white wax, 20 parts each; almond oil and paraffine, 20 parts each. Glycerine is also an excellent solvent. Free application of the saturated solution is the best remedy for the fetid perspiration of the feet which often causes so much annoyance. [In the *aphthous sore-mouth* of children, in which it acts in a similar manner, borax and sugar has long been a favorite remedy, and a solution of borax forms a common wash for use in disorders of the hairy scalp, and in scaly eruptions. In pruritus, tinea circinata, pityriasis versicolor, etc., boric acid solutions are of much service.

Boric acid, finely levigated, has been used of late years with great success, insufflated into the auditory canal, in cases of chronic suppurative discharges from the ear. It appears to be perfectly free from irritation, and quickly reduces the offensive character of the discharge as well as its quantity. Boric acid has also been used in general surgery as a dressing for wounds, and Mr. Lister employs it to a considerable extent in his system of dressings.

Boric acid and borax have been used in lozenges for public speakers in order to prevent *hoarseness*, but are seldom employed internally in any other form, although the latter has been highly recommended in the uric acid diathesis in doses of thirty or forty grains.]

[ACIDUM CARBOLICUM CRUDUM—CRUDE CARBOLIC ACID.

A liquid obtained during the distillation of coal-tar between the temperatures of 170° and 190° C. (338° and 374° F.), and containing carbolic and cresylic acids in variable proportion, together with other substances, U. S. (used only as an external remedy or for disinfecting purposes).

ACIDUM CARBOLICUM—CARBOLIC ACID.

[*Syn.*—Phenol. C_6H_5HO ; 94.]

A product of the distillation of coal-tar, between the temperatures of 180° and 190° C. (356° and 374° F.), U. S.

Dose, gtt. i–ij (.06 to .13 Gm.)

OFFICINAL PREPARATION, U. S.

Unguentum Acidi Carbolici (10 per cent.).

POISONING.

In poisonous doses it causes burning and pain in the stomach, mucous vomiting, clammy, cool skin, difficult breathing, insensibility, contracted pupils, collapse, and death. Post-mortem examination discloses catarrh of the mucous membrane of the stomach, inflammation of the kidneys, dark and imperfectly coagulated blood.

ANTIDOTES.

Saccharate of calcium (which may be extemporaneously prepared by adding calcium hydrate 1 pt. to sugar 3 pts.), calcium carbonate, and calcined magnesia in lime-water, are probably the best antidotes. Alkalies, soap, or the fixed oils may be given, with demulcent drinks, and the stomach evacuated with a pump or siphon, as the local effect of the acid will generally prevent emetics from acting. Atropine and cardiac stimulants are required to obviate the tendency to collapse. Nitrite of amyl might be cautiously inhaled; or an intravenous injection of diluted aqua ammoniæ administered. The soluble sulphates, as the sulphate of magnesium, of sodium, etc., are very useful for carrying off the carbolic acid from the system.]

LOCAL ACTION.

Physiological.

Carbolic acid is, in the first place, an antiseptic, from its power of destroying the minuter forms of animal and vegetable life.

It is also a useful application in tinea tonsurans, both as destroying the microspores and preventing their development; but, as redevelopment very rapidly takes place, we must apply our remedy every six hours, and continue its use for at least a fortnight after the apparent cure.

Injections (♏ss) of pure acid into various parts of the tumor are very useful in nævus, and also in varicose veins. [Similar injections of ten to twenty minims thrown into the sac of a *hydrocele* are used by Dr. R. J. Levis.]

Therapeutical.

It is therefore much used as an antiseptic and deodorant for the treatment of ill-smelling drains, etc., or to destroy the infectious properties of various secretions or discharges from the sick. It may also be useful as a lotion or injection to foul sores. Its principal application, however, in surgery, is in enabling us to carry out the far-famed antiseptic system of Prof. Lister. This eminent surgeon, adopting the views of Pasteur, and believing that suppuration, pyæmia, and various other inconveniences connected with open wounds, arise from the irritation of minute germs or particles of organic matter contained in the air, has devised a process in which the atmospheric air, before reaching the raw surface, is filtered through carbolic acid and thus deprived of its irritating properties.

We extract from Mr. Cheyne's excellent book on antiseptic surgery the following clear and condensed description of the way in which Lister's method is applied—"Take as an example of an operation the removal of a fatty tumor:

"The patient having been brought under the influence of chloroform, or other anæsthetic, the skin over the tumor, and for some distance in the vicinity, is thoroughly purified from any active dust by washing it well with a solution of carbolic acid 1–20. The surgeon and his assistants also well wash their hands in 1–40 carbolic solution, while the instruments are put to soak in 1–20; a towel is arranged close to the tumor, generally on the part of the table between the operator and the patient, which towel has been well soaked in 1–20 carbolic lotion, and is meant as an antiseptic basis on which instruments may be laid during the course of the operation without any fear of their contamination. This towel is so arranged as to be within the cloud of spray. A spray being now made to play over the part from a convenient distance, the surgeon makes his incisions, removes the tumor, ties the vessels with catgut, introduces a suitable drain, stitches up the wound, and applies a piece of protective lint, little larger than the wound, the protective being of course dipped in the 1–40 carbolic solution; outside this is applied a piece of wet gauze, consisting of several layers of loose gauze, which has been soaking for some time in the 1–40 carbolic solution. This wet gauze and protective are called the *deep dressing*. The wet gauze must overlap the protective in all directions. Then any remaining hollow is filled up with loose gauze, and outside the whole a gauze dressing is fixed. This dressing consists of a piece of carbolic gauze of suitable size, folded in eight layers, and having the macintosh placed beneath the outermost layer, with the India-rubber side inwards. The dressing is fixed by means of a bandage, and when this is accomplished the spray may be stopped. Then around the edge of the dressing an elastic bandage is applied so as to keep the edge constantly in contact with the body, and to allow no interval to occur between the dressing and the skin during the movements of the patient. The elastic is carefully fixed to the edge of the dressing by means of safety-pins. In the after progress of the case the dressing is changed according to the amount of discharge, though in no instance is it left longer than eight days." [Many surgeons have discarded carbolic acid in favor of mercuric chloride solutions, 1–2000 for wound dressing, and the spray is almost obsolete.]

Physiological Effects.	*Therapeutical.*
Carbolic acid is an irritating substance, and, if applied sufficiently long to the skin, will cause sloughing. It has, however, undoubted anæsthetic properties.	Although carbolic acid may be of use in correcting fetor, it is too irritating to make a good lotion for wounds or ulcers.

It has been used as a caustic in some ulcerative affections, as *lupus*. It has been recommended as a local anæsthetic during small operations, and to deaden the pain of some caustic applications. [The pain of opening a *felon* may be greatly reduced by previously immersing the finger for a few minutes in a 3 to 5 per cent. solution of carbolic acid.]

A good application in tinea tonsurans is:—

℞			
	Sulphuris precipitat.,		
	Zinci oxidi āā ʒj; or	4	Gm.
	Olei olivæ ℥j;	32	"
	Acid carbolici gr. xvj	1 06	"

It is also readily absorbed through the skin, [and Continental observers describe dangerous results, as frequently following its use in antiseptic surgery. These, however, are rarely, if ever, met with in British practice, Mr. Cheyne telling us that serious symptoms have only twice occurred in Prof. Lister's practice. This he ascribes to the fact that the acid is brought as little as possible in contact with wounds.]

We must therefore remember that symptoms of poisoning may readily be produced by the application of carbolic acid over any considerable cutaneous area. The inhalation of carbolic acid, its local application by spray, or the diffusion of a 20 per cent. solution in a spray through the room has proved very useful in whooping cough; and the bacillary theory of phthisis naturally suggests the destruction of the active agents in producing the disease by this or some other form of antiseptic inhalation. For which cases, Dr. R. J. Lee has invented a very convenient form of inhaler.

INTERNAL ACTION.

Carbolic acid, if administered in sufficient quantity, is very poisonous in its operation, killing by causing paralysis of the respiratory centre. The heart continues to beat even after the respiration is arrested and the temperature falls. In severe cases we find collapse with stertorous breathing, great pallor, and sudden death from respiratory failure; whilst a milder attack is characterized by loss of appetite, nausea, and vomiting, a large secretion of frothy saliva, dysphagia, anxiety, and fever. The urine is diminished in quantity, and on standing acquires an olive-green color.

Carbolic acid has occasionally caused death by being accidentally drunk in mistake for beer, or by being incautiously applied to the skin. The best antidotes are olive oil and saccharated lime; also, sulphate of sodium, in doses of a tablespoonful every half hour, of a solution containing five parts in from one to two hundred parts of water, the antidote being held to convert the carbolic into non-poisonous phenol. The subcutaneous injection of sulphate of atropine has been advised, and also of ether and camphor.

It is occasionally given internally to counteract *flatulence* and *sarcinous vomiting;* but the sulpho-carbolates, and more especially that of sodium, are the most convenient forms for its administration in doses of 15 to 30 grains. [Carbolic acid has been recommended for *tænia*, in pill form, taking three to five grains in the course of the day.]

ABSORPTION AND MODE OF ELIMINATION.

Carbolic acid is rapidly absorbed, and quickly and entirely given off by the urine, to which it imparts a peculiar greenish-black hue and its own peculiar smell. [This may also occur as a result of absorption of carbolic acid from the dressings after a surgical operation.]

[ACIDUM CHROMICUM—CHROMIC ACID (CrO_3; 100.4).

Small, crimson, needle-shaped crystals, deliquescent, very soluble in water, decomposes with alcohol, sometimes explosively.

EFFECTS AND USES.

Chromic acid is an escharotic and antiseptic; it rapidly oxidizes organic matter and is the most energetic disinfectant known. A strong solution (gr. c. to f℥j) may be applied with a glass rod to destroy *warts*, *condylomata*, and *excrescences*, or to reduce *enlarged tonsils*. Greatly diluted (gr. ss to f℥j) it forms a detergent wash for *mercurial stomatitis*, *scurvy*, *diphtheria*, *œdema of the glottis*, *ulcers*, and *phagedæna*. On account of the difficulty of limiting its effect it should not be applied in substance, as, when used in this manner to destroy warts on the fingers, it has been known to penetrate and destroy the joint.]

[ACIDUM CITRICUM—CITRIC ACID ($H_3C_6H_5O_7.H_2O$; 210).

Colorless prisms soluble in three-fourths part of water.

OFFICINAL PREPARATIONS, U. S.

Syrupus Acidii Citrici (8 parts in 1000). Used as a vehicle.

Liquor Ferri Citratis, Liquor Magnesii Citratis, Liquor Potassii Citratis, Lithii Citras, Potassii Citras, and in preparing Ferri Pyrophosphas.

Dose, gr. x–xxx (= .65 to 2 Gms.).

EFFECTS AND USES.

As a refrigerant in fevers, citric acid solution is used in the form of lemonade, neutral mixture (liquor potassii citratis), or the citrates. It has been used in *scurvy*, *liver disease*, and *rheumatism*, and as an application to the throat in *diphtheria* (gr. viiss to f℥j). Dr. H. Bence Jones believes that lemon juice and citric acid increase the acidity of the urine;

they consequently are contra-indicated in *lithuria*, and should not be given for a length of time, continuously, in the gouty diathesis.]

EXTERNAL USE.

Citric acid was proposed a few years ago as a soothing local application to cancerous sores, but of this little has recently been heard.

INTERNAL USE.

Citric acid is used chiefly as a cheap and convenient substitute for lemon juice in effervescing draughts, which are very extensively prescribed on account of their cooling and refreshing properties in feverish conditions, and for the soothing influence of their carbonic acid when the stomach is irritable.

Whenever lemon juice can be procured, it should be used in preference; but at periods of the year when this fruit is out of season, citric acid will act well, and we here give a table from Squire, showing the proportions in which the acid and alkali should be prescribed to insure exact saturation.

17 grs. (1.12 gm.) of citric acid, or half a fluidounce of fresh lemon juice	will neutralize	25 grs.	(1.6 gm.)	bicarbonate of potassium.
		20 "	(1.3 ")	carbonate of potassium.
		20 "	(1.3 ")	bicarbonate of sodium.
		35 "	(2.3 ")	carbonate of sodium.
		15 "	(1. ")	carbonate of ammonium.
		13 "	(.78 ")	carbonate of magnesium.

ACIDUM HYDROBROMICUM DILUTUM—DILUTE HYDROBROMIC ACID.

[*A clear, colorless liquid containing ten per cent. of absolute Hydrobromic Acid. Dose,* fʒj–℥j (*4 to* 32 *Gm.*).]

This is an excellent addition to a quinine mixture, because it not only dissolves the alkaloid, but prevents in some degree the unpleasant deafness and ringing in the ears which often follow its administration. [It has also been used as a substitute for the bromides in congestive headache, insomnia, tinnitus aurium, etc. Two fluid drachms containing twelve grains of bromine are equivalent to eighteen grains of potassium bromide.]

ACIDUM HYDROCHLORICUM—HYDROCHLORIC ACID. (MURIATIC ACID, Ph. 1870.)

[*A liquid composed of* 31.9 *per cent. of absolute hydrochloric acid and* 68.1 *per cent. water, U. S. P. Dose,* ♏*j–x* (.06 *to* .60 *Gm.*).

Acidum Hydrochloricum Dilutum (Hydrochloric acid 6 parts, distilled water 13 parts). Dose, ♏x–xl (.60 to 2.60 Gm.).

Enters into the preparation of Acidum Hydrocyanicum Dilutum (extemporaneous), Antimonii Oxidum, Calcii Phosphas Precipitatus, Carbo Animalis Purificatus, Quininæ Sulphas, Strychnina, Sulphur Præcipitatum, and Acidum Nitrohydrochloricum, Aqua Chlori, Barii Chloridum, Ferri Chloridum, Liquor Acidi Arseniosi, Liquor Calcii Chloridi, Liquor Ferri Chloridi, Liquor Zinci Chloridi, Morphinæ Murias, and Resina Podophylli.

Poisoning.

Hydrochloric acid is a corrosive mineral poison. It causes a burning pain in the pharynx and epigastrium, strong styptic, acid taste in the mouth, much thirst, tense and frequent pulse, dry and hot skin, red glazed tongue, lips black. There is vomiting of blood and yellow matter, having the odor of the acid. Some of the vomit falling on a marble table causes foaming, from escape of carbonic acid gas. Cold sweats, delirium, and collapse terminate life. After death the parts in contact with the acid are stained and highly inflamed, and may be eroded. The vapor of ammonia produces a characteristic white cloud of ammonium chloride. Nitrate of silver throws down a white precipitate, which afterwards becomes black. Only the presence of a large excess of free acid can establish the proof of poisoning by it.

Antidotes.

The same as for the other mineral acids; the alkalies and their carbonates; magnesia, soap, and bland drinks may be freely given. Muriatic acid stains the mouth and lips *black*, when taken undiluted.]

EXTERNAL USE.

Hydrochloric acid is a good form of application to *diphtheria*, when it is used combined with equal parts of honey.

INTERNAL USE.

Of all the acids used in medicine, this has undoubtedly the most beneficial action in *dyspepsia*, on account probably of its forming one of the normal constituents of the gastric juice. In cases where we suspect the formation of an excessive quantity of this fluid, we may, on the principles already enunciated, limit its secretion by prescribing the acid immediately before meals. When the epigastric pain comes on immediately after eating, the condition is no doubt due to an irritable or perhaps ulcerated condition of the stomach itself, and we may best hope for success by carefully regulated diet and the use of bismuth, soda, or hydrocyanic acid. But when the pain does not set in with severity until from an hour to a couple of hours after food has been swallowed, the explanation probably is that an abnormal excess of gastric juice has been secreted, and a recurrence of this will best be checked by giving a little of the acid before meals.

Hydrochloric acid has also been much recommended by Dr. Chambers and others in *typhoid fever*, and it will generally be found that 20-minim doses of the dilute acid are very grateful to the patient, as quenching the thirst and moistening the tongue.

In dyspepsia ♏xx ad xxx (1.30 to 2 Gm.). In typhoid fever ♏xx (1.30 Gm.) of the dilute acid every two hours.

℞. Acidi hydrochlor. dil.	♏xx;	or	1·30	Gm.
Sp. chloroformi	♏xv	"	1	"
Infusi gentianæ	f℥j	"	32	"

M. S. Ter in die.

In *dyspepsia*.

[ACIDUM GALLICUM—GALLIC ACID.

See GALLA.]

ACIDUM HYDROCYANICUM DILUTUM—DILUTE HYDROCYANIC ACID (PRUSSIC ACID).

[*A liquid composed of 2 per cent. of absolute hydrocyanic acid and 98 per cent. of alcohol and water, U. S. P.*

Officinal Preparations, U. S.

Argenti Cyanidum. } Not used internally.
Hydrargyri Cyanidum. }
Potassii Cyanidum, gr. $\frac{1}{10}$ to $\frac{1}{12}$ (.005 Gm.).

Poisoning.

Prussic acid and the cyanide of potassium, in sufficient doses, are almost immediately fatal, so that in most cases no symptoms, except sudden collapse and death, are present. (For a more detailed account of the effects, see page 120.)

Antidotes.

Chlorine or ammonia may be cautiously inhaled, accompanied by *cold affusions to the spine*, and artificial respiration. As a chemical antidote, sulphate of iron (gr. x), and tincture of the chloride of iron (fʒj), dissolved in a fluid ounce of water, may be given immediately, to be followed by twenty grains of carbonate of potassium, likewise in solution, forming with the poison insoluble *Prussian blue.* Atropine is stated to be a physiological antidote.

Tests.

The peculiar bitter almond odor. A physiological test can be made by injecting some of the suspected fluid, hypodermically, into a rabbit, and observing its effects. When a little potassa is mixed with liquids containing this poison, and solution of the sulphate or sesquichloride of iron added, a grayish-green precipitate is thrown down—which deepens to a Prussian-blue tint on addition of a few drops of sulphuric acid. The nitrate of silver produces a white (*cyanide of silver*) precipitate; which, after being washed and dried, and then held on a watch-glass over a flame, burns with a fresh rose-color, cyanogen being at the same time evolved.

Sulphur Test.—Place two drops of a solution of hydrosulphate of ammonia, containing an excess of sulphur, in the centre of a watch-glass, and invert it accurately over the vessel containing the poisoned liquid. Remove the glass in three or four minutes, and dry the moistened spot gently over a spirit-lamp. Let a drop of water fall on the white film, and then a drop of the perchloride of iron. If prussic acid be present, a blood-red solution (sulpho-cyanide of iron) is produced; and this red color is discharged by the addition of one or two drops of a solution of corrosive sublimate.

When a mixture is to be examined, containing matters from the stomach, etc., if alkaline, it must first be neutralized by addition of sulphuric acid, then one-eighth part cautiously distilled therefrom into a receiver immersed in some frigorific mixture; and the product may then be tested by nitrate of silver, etc., as above.]

EXTERNAL ACTION.

Physiological.

Prussic acid applied to the skin in a concentrated form may cause at first slight irritation, but secondarily diminishes its sensibility, acting in some degree as an anæsthetic, probably from a benumbing influence on the extremities of the sensory nerves.

Therapeutical.

It is therefore used externally, largely diluted, to relieve *neuralgic* pain and allay itching, more especially in skin disease. We may thus hope to alleviate the tormenting irritation often attending *prurigo* and *eczema;* but we must be careful never to let the lotion come in contact with any abrasion on the surface, as prussic acid is very readily and rapidly absorbed.

INTERNAL ACTION.

Hydrocyanic acid, being the most powerful and speedy poison with which we are acquainted, requires to be prescribed with very great caution.

Physiological.

1. *On the Nervous System.*—Prussic acid has some effect on the brain, causing giddiness and slight stupor; the respiratory centre in the

Therapeutical.

1. It is used with great benefit in those forms of dyspepsia attended with epigastric pain and vomiting following food, and whether

medulla next becomes weakened, and the motor nerves are more or less paralyzed, causing excessive muscular feebleness.

2. The *respiration* becomes slow and irregular, and finally ceases: death in cases of poisoning being generally due to suffocation. The sensory nerves are also enfeebled in their conducting power.

3. Prussic acid has a powerful sedative action on the *heart*, the circulation becoming slow, feeble, and irregular under the influence of poisonous doses; and this arises both from an influence on the nerves and on the muscular structures of the heart itself.

It also acts directly on the blood, combining with the hæmoglobin of the red corpuscles, and preventing them from properly fulfilling their duty of carrying oxygen to the tissues.

4. Prussic acid has no special influence on the *temperature* or on *secretion*, save that the saliva is generally increased in quantity.

depending on gastric ulcer, or on mere irritation of the mucous membrane. It has also been given in *whooping-cough;* but in my experience its action is here very uncertain, and I have been unable to satisfy myself that it is a remedy of much value. In some forms of chronic and spasmodic cough it does good, but it is essentially in *dyspepsia* that we obtain real advantage from its use.

3. It has been successfully employed in nervous palpitation [or irritable heart.]

Prussic acid is very rapidly eliminated from the system, probably by the breath, and half an hour may be sufficient for this purpose, so that in a case of poisoning we may have good hopes of recovery, if we can sustain the powers of life during this period.

Poisonous Effects.—In a large dose prussic acid kills immediately, the victim frequently uttering a loud cry, and expiring from cardiac syncope. If the quantity taken be smaller, symptoms of suffocation supervene from paralysis of the respiratory centre, and, if the process of poisoning be more gradual, from deficient supply of oxygen in the blood; other symptoms noted being convulsions, great muscular prostration, dilatation of pupils, and quick, feeble, irregular pulse. *Post-mortem* examination shows nothing characteristic.

If the poison be taken in a concentrated form, death may ensue very rapidly, in probably less than a minute. Preyer, who has devoted special attention to the subject, observed a guinea-pig apparently dead one second after inhaling some gaseous acid, efforts at breathing ceasing in fifteen seconds. He, therefore, considers this the most deadly mode of its administration; but no matter how it enters the body, it speedily kills any animal, and, curiously enough, it is equally destructive to plants.

Treatment.— Considering the great rapidity of the action of hydrocyanic acid, it is comparatively seldom that we have any opportunity of employing antidotes; but supposing we see a case sufficiently early to do so, we should have vigorous recourse to cold affusion and the inhalation of ammonia and chlorine water. Artificial respiration should be then steadily persisted in, and if we can thus counteract the tendency to death by suffocation, and tide the patient over the first half-hour, we may look forward to success, never despairing as long as the faintest pulsation can be felt in the heart. Secondary auxiliary means exist in the internal administration of ammonia, of chlorine water, or of carbonate of potash, followed by the mixed sulphates of iron, which convert the poison into Prussian blue; and recently the subcutaneous injection of atropine has been proposed as the true physiological antidote.

Dose and Mode of Administration.

One grain of anhydrous acid has caused death, and of this the preparation used in medicine contains 2 per cent. (the old Scheele's, which is now obsolete, having contained 4 per cent.).

In consideration of the rapid way in which the acid is thrown out of the system, we must repeat the dose frequently, from every hour to every three hours; and it is well not to order too large a quantity at one time, not because the acid tends to float on the top, as was formerly supposed, but because there is always a chance of an overdose being given through ignorance or carelessness. We may safely prescribe from 2 to 6 minims, beginning always with ♏ j, suspending it if the patient complains of any constriction about the throat. For external use fʒij may be dissolved in 8 ounces of water or rose-water.

℞.	Acidi hydrocyanici diluti		fʒij;	or	8	Gm.
	Glycerini		f℥j;	"	32	"
	Aquæ rosæ	q. s. ad	f℥viij;	"	256	"

Misce, fiat lotio.
S. To be applied with a soft sponge.

In a case of troublesome itching.

℞.	Acidi hydrocyanici diluti	♏xij;	or		75 Gm.
	Misturæ amygdalæ	f℥vj;	"	192	"

Misce, fiat mistura. Capiat cochlearia magna duo tussi admodum ingravescente.

For a case of irritable cough.

℞.	Acidi hydrocyanici diluti		♏xxv;	or	1	60 Gm.
	Bismuthi subnitratis		ʒss;	"	2	"
	Syrupi aurantii		f℥j;	"	32	"
	Infusi gentianæ	q. s. ad	f℥viij;	"	256	"

Misce. Capiat cochlearia magna duo ter in die ante cibum.

In a case of irritative dyspepsia.

Or, a few drops of prussic acid may be added to the ordinary effervescing draught with good effect.

[ACIDUM LACTICUM—LACTIC ACID.

A liquid composed of 75 per cent. absolute lactic acid, and 25 per cent. of water.

OFFICINAL PREPARATIONS, U. S.

Syrupus Calcii Lactophosphatis (Precip. Phosphate of Calcium 22, Lactic Acid 33 in 1000). Dose, ʒj–ʒij (4–8 C.).

Ferri Lactas. Dose, gr. v. (.30 Gm.)

A syrupy, nearly transparent liquid, with slight odor and a very sour taste, obtained from sour milk. It has been found in the gastric juice, and may prove a useful addition to preparations of pepsin. It has been given in *dyspepsia* (dose fʒj), in sweetened water at meal-time. Locally it has been employed (diluted four-fifths) as an application to the false membrane in *croup* and *diphtheria*.

According to Prout, *rheumatism* is connected with an excess of lactic acid in the blood; and this would explain the benefit derived from the alkaline treatment.]

ACIDUM NITRICUM—NITRIC ACID.

[*A liquid composed of* 69.4 *per cent. of absolute nitric acid and* 30.6 *per cent. of water.*

Acidum Nitricum Dilutum, 10 per ct. absolute nitric acid (acid 1 to water 6 parts). Dose, ♏xv–xl (1–2.60 Gm.).

Also enters into Acidum Nitro-hydrochloricum, Acidum Nitro-hydrochloricum Dilutum, Argenti Nitras, Bismuthi Subnitras, Liquor Ferri Nitratis, Liquor Hydrargyri Nitratis, Spiritus Ætheris Nitrosi, Unguentum Hydrargyri Nitratis, and in the preparation of Acidum Phosphoricum Dilutum, Antimonii Oxidum, Bismuthi Subcarbonas, Cadmii Sulphas, Hydrargyri Oxidum Rubrum, Liquor Ferri Chloridi, Liquor Ferri Subsulphatis, Liquor Ferri Tersulphatis, Liquor Zinci Chloridi, and Pyroxylon.

ANTIDOTES.

The symptoms are those of a violent irritant and corrosive poison. Treatment must be prompt, by alkalies, demulcents, and in short the same method is followed as in poisoning by the other mineral acids. Nitric acid stains the skin *yellow*.]

EXTERNAL USE.

Nitric acid is undoubtedly the best form of local application in all forms of sloughing or phagedænic ulceration, whether of venereal origin or otherwise. In these rapidly destructive forms of disease, we shall do well to place our patient under the influence of an anæsthetic, and then apply the strong acid freely and thoroughly to all parts of the affected surface, and we shall thus often succeed in arresting a process which would otherwise go on to severe and even fatal disorganization.

It is also used locally in the treatment of *piles*, more especially those flat irritable forms of tumor which do not come readily within the reach of the clamp or ligature.

In the proportion of 10 or 20 minims to an ounce, nitric acid forms a good astringent lotion in cases of indolent or unhealthy sores: and it has been recommended by Dr. Roberts, of Manchester, as an injection into the bladder for the solution of *phosphatic calculi*.

INTERNAL USE.

Given internally, nitric acid has tonic properties, and, in combination with bark and opium, acts well in cases of foul or sloughing ulceration. Again, in constitutions broken down by syphilis or by chronic hepatic disease, we may very beneficially give our patient from 15 to 20 minims of the dilute acid three times a day, its action on the liver being by some supposed to have somewhat of a specific character.

℞. Acidi nitrici diluti	fʒij;	or	8		Gm.
Tincturæ opii	♏xl;	"	2	60	"
Tincturæ cinchonæ	f℥ss;	"	16		"
Decocti cinchonæ ad	f℥viij;	"	256		"

Misce. Capiat cochlearia magna duo ter in die.

In the case of foul or sloughing ulcer.

ACIDUM NITRO-HYDROCHLORICUM—NITRO-HYDROCHLORIC ACID.

Nitric acid 4 *parts, hydrochloric acid* 15 *parts.*

[Dose, ♏ij–v (.13 to 30. Gm.).

Acidum Nitro-hydrochloricum Dilutum.

Nitric acid, 4 *parts, hydrochloric acid* 15 *parts, distilled water* 76 *parts.*

Dose, ♏v–xx (.30 to 1.30 Gm.).]

This is supposed to have some special action on the liver, and is most extensively used in chronic functional affections of that organ. It has also been highly recommended, in the form of bath, in various hepatic disorders in the proportion of six fluidounces to each gallon of water. Or, internally—

℞. Acidi nitro-hydrochlor. diluti	fʒij;	8	Gm.
Extract. taraxaci	f℥ss;	16	"
Spiritus chloroformi	fʒiss;	6	"
Aquæ q. s. ad	f℥viij;	256	"

M. S. Capiat cochlearia magna duo ter in die.

In a case of sluggish liver.

ACIDUM OLEICUM—OLEIC ACID.

[*A yellowish, oily, liquid, gradually becoming brown, rancid, and acid, when exposed to the air. Insoluble in water. Equal volumes of the acid and of alcohol heated to* 77° *F. should give a clear solution, without separating oily drops upon the surface.*

The officinal Oleates are — Oleatum Hydrargyri, Oleatum Veratrinæ.]

This is used in the manufacture of the oleates of mercury, lead, zinc [and of some of the alkaloids such as Morphine, Atropine, Veratrine, Aconitine, etc.], which are clean and handy preparations.

ACIDUM PHOSPHORICUM—PHOSPHORIC ACID.

[*A colorless, odorless liquid containing* 50 *per cent. of orthophosphoric acid.*

Dose ♏iij to viij (.20 to .50 Gm.).

Acidum Phosphoricum Dilutum. (Contains 10 per cent. Orthophosphoric Acid.) Dose, ♏xv–xlj (1. to 2.00 Gm.).]

The officinal phosphates are—Ammonii Phosphas; Ferri Phosphas, and Sodii Phosphas.

The officinal hypophosphites are—Calcii Hypophosphis; Ferri Hypophosphis; Potassii Hypophosphis; Sodii Hypophosphis.

This acid has been credited with various special therapeutical virtues none of which have stood the test of experience, and it is now merely used as a light and agreeable tonic and astringent. We take occasion, however, to mention a mistake which is not uncommonly made in prescribing, and that is to prescribe phosphoric acid with the view of obtaining the medical influence of phosphorus. Now it is well known that only from phosphorus in a free condition do we obtain any real benefit, and of this phosphoric acid contains no trace.

[It has, however, been used as a tonic and alterative in *rickets* and *scrofula;* and is an excellent adjuvant to cough-mixtures, or tonics, for elderly patients.]

ACIDUM SALICYLICUM—SALICYLIC ACID.

[*Fine, white, needle-shaped crystals, sol. in* 450 *parts cold or* 14 *parts hot water.*

The officinal salicylates are:—

Sodii Salicylas. Dose, gr. x to ʒj (.65 to 4 Gm.).

Lithii Salicylas. Dose, gr. x to ʒj (.65 to 4 Gm.).

Physostigminæ Salicylas. Dose, gr. $\frac{1}{64}$–$\frac{1}{20}$ (.001 to .01 Gm.).]

Local Actions.

Physiological.

Salicylic acid is an excellent antiseptic, delaying putrefaction and preventing decomposition, but in this respect it is decidedly inferior to carbolic acid.

Maclagan, regarding acute rheumatism as of malarial origin, holds that salicylic acid acts by destroying the poison on which the disease

Therapeutical.

Being less irritant than carbolic acid, it has been proposed as a substitute for that substance in carrying out Lister's antiseptic system. It has also been recommended as a good lotion to raw surfaces; but Callender has shown that it not only tends to irritate the wounds, but frequently brings out a crop depends, and which, if the theory be true, is probably some form of microbe.

of irritable vesicles in their neighborhood, attended with marked constitutional disturbance. [It has been used as an application in croup, diphtheria, and hay-fever, in powder or solution.] In antiseptic surgery salicylic wool and jute are of considerable service.

CONSTITUTIONAL ACTION.

Salicylic acid is an antiseptic and antipyretic, rapidly reducing temperature in feverish conditions, although, in a state of health, the drug seems to be without influence on the body heat. Some headache, giddiness, and ringing in the ears have been observed, but the cardiac and respiratory functions are not sensibly affected.

In poisonous doses, slowing of the breathing and convulsive attacks, from diminution of the excitability of the vagus, have been observed. Nausea, burning in the throat, vomiting, and stomach irritation have occasionally been noticed to follow the use of the acid; and albuminuria with almost total suppression of urine, and occasionally hæmaturia are more rarely noted among its effects; the most usual action, however, on the kidneys being diuretic, with slight increase of urea and uric acid.

Salicylic acid is now universally allowed to be a most efficient remedy in *acute rheumatism*, very rapidly reducing temperature, relieving pain, and, in fact, cutting short the disease. By shortening the duration of the joint inflammation, it naturally limits the tendency to cardiac complications; but it seems to have no power of directly reducing the liability to this accident, nor influence over developed pericarditis, or in averting or arresting conditions of hyperpyrexia. In an ordinary case of acute articular rheumatism, we may count upon cutting short the disease in two or three days, the pain going first and then the fever. It is well to continue the drug for 10 or 15 days after the apparent cure, in order to prevent relapses, and the anæmia so often following other modes of treatment is not met with under this. It is of less service in chronic rheumatism or gout; it is useless in ague, and, although in typhoid fever the temperature may go down, no influence is exerted on the duration of the disease.

MODE OF ELIMINATION.

Elimination is effected by the urine, beginning in 10 minutes and being completed in from 24 to 48 hours, and the acid seizing glycocol from the liver and other organs, becomes converted into salicyluric acid, thus resembling the conversion of benzoic into hippuric acid. Probably a little is also given off by the sweat and saliva. The soda salt is rapidly transformed into the original acid by the carbonic acid of the blood.

DOSE AND MODE OF ADMINISTRATION.

We may give salicylic acid in 20-grain doses, repeated hourly for six hours on two successive days and continued at shorter intervals if the disease resists 48 hours' medication. As much as 280 grains have been given without injury within 12 hours, but it is always well to avoid very large doses, which are very apt to cause irritation and discomfort.

Salicylic acid, being irritating and very insoluble, has been now almost entirely displaced by the salicylate of soda, which is freely miscible with water and is readily absorbed; the dose being gr. xx to ʒj (1.30 to 4 Gm.), being generally administered in the smaller dose every hour until a drachm has been given daily.

DANGERS FROM SALICYLIC ACID.

[Several instances have occurred in which this agent has unexpectedly produced disagreeable consequences. Dr. Watelet communicated a paper to a late number of the *Bull. de Therapie* on this subject, in which the details are given of two cases of rheumatism treated by salicylate of soda, one of which was followed by gangrene of the lower extremities, and both by cystitis, obstinate constipation, and coldness of the extremities.[1]

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[1] Dublin Press and Circular.

Salicylic acid has a strong affinity for lime, and it is thought that its administration, if long continued, may injuriously affect the bones and the teeth. Whether this technical objection also exists against it when given in combination with alkalies, is not clear, but in this form it is certainly safer, and these salts are now generally used in preference to the acid itself.]

Since these alkaline salts have come into general use, we have heard much less of the uncomfortable effects occasionally caused by the acid, and some of which, at all events, were due to impure preparations containing carbolic or cresylic acid. But, in addition to the peculiarities mentioned above, careful observers have described urticaria and irritable erythematous and vesicular, cutaneous affections and sore throat, with a species of quiet delirium and feverish symptoms, and we are specially warned to be aware of its use in kidney disease. As a general rule, however, the sodium salt may be freely prescribed without the anticipation of any of these undesirable results.

Salicylic acid is very insoluble, and it is difficult to find a ready medium for its administration. Messrs. Savory and Moore have devised a very elegant granular, effervescing preparation, or we may use the salicylate of sodium or ammonium. The following are good formulæ :—

℞. Acidi salicylici	ʒj ;	or	4	Gm.	
Olei amygdalæ expressi	fʒv ;	"	20	"	
Pulv. acaciæ	ʒijss ;	"	10	"	
Syrupi amygdalæ	fʒvj ;	"	24	"	
Aquæ aurantii florum q. s. ad	f℥iij ;	"	96	"	M.

S. Capiat fʒj pro dosi.

For children.

Or,

℞. Acidi salicylici	ʒj ;	or	4	Gm.	
Alcoholis	fʒijss ;	"	10	"	M.

Dissolve.

Potassii citratis	fʒj ;	or	4	"	
Syrupi aurantii	fʒij :	"	8	"	
Aquæ	f℥iijss	"	10	"	M.

S. Mix the two solutions and filter, and then dilute with water to taste.

[The following is used by Da Costa quite extensively in *acute rheumatism* :—

℞. Sodii salicylatis	gr. xx ;	or	1	30	Gm.	
Glycerini	♏xv ;	"	1		"	
Tinct. lavandulæ comp.	♏vijss ;	"		50	"	
Aquæ	q. s. ad ℥ss ;	"	16		"	M.

Fiat haustus quartis horis sumendus.]

ACIDUM SULPHURICUM—SULPHURIC ACID.

[A liquid composed of not less than 96 per cent. of absolute Sulphuric Acid (H_2SO_4 : 98), and not more than 4 per cent. of water.

A colorless, oily liquid of sp. gravity not less than 1.840.

PREPARATIONS.

Acidum Sulphuricum Dilutum—Dilute Sulphuric Acid (ten per cent. of officinal acid). Dose ♏ij–x (.12 to 2 Gm.).

Acidum Sulphuricum Aromaticum—Aromatic Sulphuric Acid (about 20 per cent). Dose ♏iij–xx (.20 to 1.35 Gm.).

Also enters into the manufacture of Acidum Sulphurosum, Aluminii Sulphas, Atropinæ Sulphas, Cadmii Sulphas, Ferri Sulphas, Hydrargyri Sulphas Flava, Liquor Ferri Subsulphatis, Liquor Ferri Tersulphatis, Oleum Æthereum, Quininæ Sulphas, Acidum Hydrocyanicum Dilutum, Æther, Argenti Cyanidum, Chloroformum Purificatum, Hydrargyri Chloridum Corrosivum, Hydrargyri Chloridum Mite, Hydrargyri Cyanidum, Pyroxylon, Sodii Phosphas, Spiritus Ætheris Nitrosi, and Veratrina.

TESTS.

If in a concentrated state, any organic matter placed in contact with it is blackened and charred ; when mixed with an equal bulk of water, much heat is evolved ; when boiled with copper filings or mercury, sulphurous acid gas is generated. When the acid is in a diluted state, the best test is nitrate of barium, which causes a dense white precipitate of sulphate of barium ; this can be verified by calcining it for some minutes with an equal weight of charcoal, wrapped in platina foil, then introducing the residue into a glass tube and adding a few drops of muriatic acid. This will liberate sulphuretted hydrogen, which can be recognized by its odor, and by its blackening carbonate or acetate of lead.

POISONING.

The symptoms are those of an acrid, corrosive poison. They come on suddenly after taking food or medicine, and the patient soon becomes collapsed. Recovery is apt to be followed by stricture of the œsophagus.

ANTIDOTES.

Alkalies should be given in milk or soapsuds, though much water would be improper. Care should be taken not to rupture the stomach with the tube of the stomach-pump, or by inducing severe efforts at vomiting. The acid, when concentrated, discolors the mouth and lips, making a *black* slough. When administered medicinally it should be taken much diluted, through a glass tube, in order to protect the teeth.]

EXTERNAL USE.

Strong sulphuric acid is the most powerful caustic of this group, rapidly charring and desiccating the tissues, from its great affinity for water. M. Velpeau, of Paris, strongly recommended its use in cancer, the acid being made into a paste with saffron, and applied to the morbid growth, it being found, after detachment of the sloughs, that a clean ulcerating surface remained; and Professor Syme proposed a modification of this plan, on the score of economy, by using sawdust instead of saffron. Ricord, of Paris, also advises the application of sulphuric acid in combination with charcoal toprimary *syphilitic sores*, holding that, if this process is effectually carried out before the fourth day, we may hope to avert the evil consequences of constitutional infection.

Mr. Pollock has advised the local use of strong sulphuric acid in *caries* and *necrosis* and suppurating synovial membrane of joints, either applied on a glass rod, or injected, or brought into contact on lint with the diseased surfaces, in the proportion of one part of acid to two, three, or six parts of water; and this plan of treatment has been used with good success in St. George's Hospital (*vide* "Lancet," May 28, 1870, and "Medical Times and Gazette," December 11, 1875). [Hydrochloric acid is a better solvent for dead bone, because the chloride of lime is more soluble than the sulphate.]

INTERNAL USE.

Diluted sulphuric acid is a good astringent, and as such is extensively used in night sweats and in diarrhœa, more especially that which is so common in summer. It has also been advised in the form of lemonade, as a prophylactic against *painters' colic*, and there is no doubt that it heightens materially the action of purgative salts, probably by increasing their solubility.

℞. Magnesii sulphatis	℥ij ;	64	Gm.
Ferri sulphatis	gr. xxiv ;	1	60
Acidi sulphurici diluti	fʒij ;	8	
Infusi calumbæ	q. s. ad f℥viij ;	256	

Misce, fiat mistura.
S. Capiat cochlearia magna duo omni mane.

℞. Acidi sulphurici diluti	fʒiiss ;	10	Gm.
Tincturæ opii	fʒj ;	4	"
Syrupi aurantii	f℥j ;	32	"
Aquæ	q. s. ad f℥viij ;	256	"

M. S. Capiat unciam unam ter in die post singulas sedes liquidas.

[For dysentery.]

ACIDUM SULPHUROSUM—SULPHUROUS ACID.

[*A liquid composed of about* 35 *per cent. of sulphurous acid gas, and about* 96.5 *per cent. of water, U. S. An aqueous solution of sulphurous acid gas, having the odor of burning sulphur, and a sulphurous, sour, and somewhat astringent taste. Its specific gravity is about* 1.022.

Dose fʒss and fʒij (2.to 8. Gm.). Largely diluted with water.]

EXTERNAL USE.

The therapeutic properties of this acid depend in part on its very poisonous influence on the lowest forms of animal and vegetable life. Thus it forms a good application to those varieties of skin disease, as *tinea tonsurans*, *chloasma*, etc., which depend on the presence of a minute cryptogamic plant; and Dr. Dewar some years ago published a pamphlet in which he ascribed to this acid powers little short of marvellous. Going on the theory that a very great number of diseased conditions depend on the irritation of germs, Dr. Dewar most confidently advised its use in affections ranging from rheumatic fever to chilblains. Although experience has, naturally, not borne out his extravagant assertions, we have to thank him for making known to us the undoubtedly good effect of sulphurous acid in various forms of sore throat, used in considerable dilution either as spray or gargle. It is also a good disinfectant, as we know that the antiseptic properties of sulphur, when burnt for purifying purposes, depend on its formation.

INTERNAL USE.

Sulphurous acid has been recommended by Dr. Lawson in *pyrosis*, the dyspeptic symptoms attending which are due to various forms of leptothrix and vegetable growths burrowing in the mucous membrane of the stomach; and in *flatulence* it is also deserving of a trial.

[TANNIC ACID.

Light yellowish scales, soluble in sixteen parts cold water.

OFFICINAL PREPARATIONS, U. S.

Acidum Tannicum. Dose, gr. j–iv (.06 to .24 Gm.).

Unguentum Acidi Tannici (ten per cent.).

Trochisci Acidi Tannici, each gr. j. Dose 1 to 5.

Collodium Stypticum. Styptic Collodion. (Tannic acid, 20; alcohol, 5; stronger ether, 20; collodion, 55.)

EXTERNAL USE.

The test for tannic acid is albumen, gelatin, or the salts of iron; with the first two it produces an insoluble precipitate, with the last a black color in solution.

Tannin is incompatible with albumen, gelatin, the glucosides, and substances containing alkaloids, and with most metallic salts in common use.

For medical uses, see GALLA.]

[ACIDUM TARTARICUM—TARTARIC ACID.

In colorless prisms, soluble in 0.7 part cold water.

The officinal tartrates are Antimonii et Potassii Tartras (Tartar Emetic), Ferri et Ammonii Tartras, Ferri et Potassii Tartras, Potassii Tartras, Potassii et Sodii Tartras (Rochelle Salt), Potassii Bitartras.

OFFICINAL PREPARATION.

Pulvis Effervescens Compositus. (Seidlitz powder.) (Each contains 35 grains tartaric acid, and 40 grains bicarbonate of sodium, with two drachms of Rochelle Salt.)

(Also enters into Abstractum Aconiti and Extractum Aconiti.)

POISONING.

Tartaric acid is a corrosive vegetable poison; its symptoms are very analogous to those caused by oxalic acid, and the morbid appearances likewise resemble those produced by oxalic acid.

TESTS.

When heated on platina foil, it burns with a pale reddish flame, and exhales a peculiar acrid vapor, leaving much carbonized matter. When a solution is treated with lime-water, it affords a white precipitate, soluble in an excess of the acid; when treated with caustic potassa, it affords a granular precipitate of the bitartrate.

ANTIDOTES.

The alkalies, magnesia, lime, soap, or the alkaline carbonates.

INTERNAL USE.

It has been stated that tartaric acid, in .60 to 1.30 gm. (gr. x–xx) doses, given thrice daily will render the urine acid. The tartrate of magnesium has been recommended as a cheaper substitute for the citrate as an aperient, and is considered quite as efficient. In sweetened solution, tartaric acid is sometimes used as a refrigerant drink in fevers. The tartrates are laxative and diuretic.]

[Acida.

Lists of acids, officinal in the U. S. Pharmacopœia :—

Acidum Aceticum
" " Dilutum
" " Glaciale
" Arseniosum
" Benzoicum
" Boricum
" Carbolicum
" " Crudum
" Chromicum
" Citricum
" Gallicum
" Hydrobromicum Dilutum
" Hydrochloricum
" " Dilutum
" Hydrocyanicum Dilutum
Acidum Lacticum
" Nitricum
" Nitricum Dilutum
" Nitro-Hydrochloricum
" " Dilutum
" Oleicum
" Phosphoricum
" " Dilutum
" Salicylicum
" Sulphuricum
" " Aromaticum
" " Dilutum
" Sulphurosum
" Tannicum
" Tartaricum]

ACONITUM—ACONITE.

[*The tuberous root of Aconitum Napellus* (*N. O. Ranunculaceæ*).

Dose, gr. ½ to ij (.03 to .13 Gm.).

Officinal Preparations, U. S.

Abstractum Aconiti. Dose, gr. ½ to 1 (.03 to .06 Gm.).

Extractum Aconiti. Dose, gr. j to ss (.01 to .03 Gm.).

Extractum Aconiti Fluidum. ♏ ½ to ij. (.03 to .13 Gm.).

Tinctura Aconiti. (40 per ct.) Dose, gtt. j–v (.06 to .30 Gm.).

(Fleming's tincture of aconite root contains 66⅔ per cent.)

Antidotes.

Finely powdered animal charcoal, tannin, astringent infusions, and hot alcoholic stimulants are useful. The stomach should be carefully washed out, and subsequent symptoms met *pro re nata.*]

Poisonous Properties.

Aconite may kill either by direct cardiac syncope, or, if the action be less rapid, by respiratory failure. Great muscular weakness is noted, the heart's action becoming feeble and irregular, the face pale, the body bedewed with clammy sweat, the pupils first contracted, and then dilated shortly before death closes the scene. The resemblance of aconite root to horse-radish has afforded several lamentable opportunities of studying cases of accidental poisoning.

Therapeutical.

In poisoning by aconite, we must endeavor to sustain the flagging action of the heart by giving stimulants, and keeping the patient most rigidly in the recumbent posture, as death has occurred from syncope produced by suddenly sitting up in bed. *Digitalis* has been proposed as the physiological antidote, bracing up and restoring the contractility of the heart muscle, twenty minims of tincture of digitalis being administered hypodermically.

LOCAL ACTION.

Physiological.

Aconite, locally applied, causes a sensation of tingling, followed by numbness of the skin, from a paralyzing influence, no doubt, on the sensory nerves. It may also bring about some local vasomotor paralysis.

Therapeutical.

Aconite is a most valuable local sedative in painful nervous affections, and more especially in *facial neuralgia*, where the tincture or liniment applied along the course of the affected nerve, will often allay and even remove suffering.

CONSTITUTIONAL ACTION.

Physiological.

1. *On Nervous System.*—1. *Brain.*—In poisoning by aconite, the intellectual faculties are usually quite unaffected, but in some cases stupor has been observed.

2. *Spinal Cord.*—Aconite paralyzes both the reflex and

Therapeutical.

the motor activity of the cord, as evidenced by almost total loss of power in the muscular system.

The respiratory centre also eventually becomes paralyzed, and death may result by suffocation.

3. Although this loss of voluntary movement is supposed to be primarily spinal in origin, it is believed that the motor nerves themselves are secondarily affected, the paralyzing influence beginning at their peripheral extremities. The inhibitory cardiac ganglia are first stimulated, and secondly depressed, and a sedative effect is produced on the sensory nerves, the earliest indication of the action of the drug being tingling followed by numbness and anæsthesia of the lips and throat.

Opinions differ as to the influence of aconite on the vaso-motor nerves, and it is not believed by many authorities to have any special operation over this system. Dr. Bagshawe, however, has published some cases of facial sympathetic paralysis, with injection and sweating, following the local application of aconite, and the diaphoretic action, so often noted, must proceed from this cause. Experimental evidence, however, is very conflicting in this, as well as in other

3. Aconite is one of our best remedies in *facial neuralgia*, given either alone or in combination with quinine. In *sick headache* also it is of service, and here it will be prescribed along with tincture of Indian hemp.

points, respecting the physiological actions of aconite.

II. *Circulating Apparatus.*—Aconite is essentially a cardiac sedative, slowing the action of the heart at first from inhibitory stimulation, but then causing an increase in the rapidity of the pulsations, with feebleness and irregularity, ending in death by arrest of all movement in diastole. At the same time the arterial pressure falls in very marked degree.

II. Aconite is an excellent antiphlogistic, cutting short inflammatory processes in their early stages. Thus in *pneumonia*, *pleurisy*, *peritonitis*, *erysipelas*, *rheumatic fever*, and in the short, sharp feverish affections of children, it is of signal service, and seems to have a directly curative action. Dr. John Harley (St. Thos. Hosp. Reports, New Series, vol. v.) made some interesting observations at the London Fever Hospital on the action of aconitina. He found that by giving $\frac{1}{200}$ of a grain once a day, which was quite sufficient to produce physiological effects, no influence was exerted on the course of 29 cases of scarlet fever, and that diaphoresis was only twice produced; whilst in 20 cases of typhus but slight controlling influence was exerted over the febrile process, although the cases did unusually well. This may prove either that the dose was not repeated sufficiently often, or that aconite has no real power over fully developed inflammatory processes. In *coryza* and in *acute tonsillitis*, also, it has been much praised for the way in which it checks the full development of these troublesome affections, and it has been highly praised as

III. *Respiration and Temperature.* — The respiratory movements tend to become slow, finally irregular, and in some cases, and almost universally in the lower animals, death results from cessation of breathing.

The temperature falls decidedly.

IV. *Digestive and Secreting Apparatus.*—Aconite has no special influence on digestion. It increases somewhat the salivary secretion and augments largely the action of the perspiratory apparatus of the skin, bringing out in some instances an irritable vesicular eruption. The urine is also somewhat increased in quantity.

given in from one-half to two minim doses where we have any reason to fear the occurrence of rigor, after catheterism.

III. Some part of the good effect of aconite in these febrile affections must be due to its power in slowing the breathing and reducing the temperature.

IV. [It has been given in the vomiting of pregnancy, but, like most remedies for this disorder, with only temporary benefit.]

Aconite is therefore an excellent diaphoretic, and to this action in some degree are due its antipyretic properties.

ABSORPTION AND MODE OF ELIMINATION.

Aconite is rapidly absorbed, and given out probably by the urine. The alkaloid aconitine, if accidentally blown into the eyes or respiratory passages, causes well-marked conjunctival and bronchial irritation. Prof. Gubler, of Paris, values it very highly in neuralgia of the fifth nerve, which he has never known to resist a quarter of a milligramme of the nitrate of aconitine, corresponding to one-half milligramme of the pure drug. He thinks we distrust the drug too much, but draws attention to a peculiar precordial disturbance, with palpitation and cardiac irregularity, rarely following its use, and warns us never to employ it in heart disease.

CAUTIONS AND MODES OF ADMINISTRATION.

The very poisonous nature of aconite renders caution necessary in its use, and we must prescribe it with great care in old persons, or where any suspicion exists of feebleness of the heart's action. In sound constitutions, however, and more especially in the case of children, we may use it with freedom, often obtaining really extraordinary results.

It is essential to encounter the inflammation at an early stage, before structural changes have set in; and it is important to combine a little stimulant with the drug. In very acute cases, our best practice will be to give the tincture in small and very often repeated doses, carefully watching the effect on the pulse. One-fourth to one-third of a drop of the tincture of aconite every ten minutes, half-hour, or hour, will be the best arrangement during the first day, after which every two hours will be a sufficient interval, the thermometer giving us meanwhile reliable information regarding the progress of the inflammatory condition. In *facial neuralgia*, also, we shall obtain the best results by quarter drop doses repeated at very short intervals, and in no case is it well to overstep a maximum dose of 5 minims.

The alkaloid aconitina is occasionally used as an external application [in ointment, containing gr. j–ij to the ounce. Squibb manufactures a two per cent. oleate of aconitina for the same purpose,] but it is not only very expensive, but dangerous on account of its extreme physiological activity.

[It has lately been used in neuralgia, especially trigeminal, in doses of $\frac{1}{120}$ to $\frac{1}{124}$ of a grain (.0005 Gm.). In feeble persons the dose to begin with should not be higher than gr. $\frac{1}{300}$ or $\frac{1}{250}$ (Seguin). Murrell has lately called attention to the great variation of the commercial forms of aconitine, which as usually supplied, is not a simple substance, but a mixture of several alkaloids. English aconitina is said to be seventeen times stronger than the German. Dangerous symptoms have been reported from minute doses, and it seems advisable for the present to employ the tincture or extract in preference. According to C. A. Wright, aconitum napellus contains at least three alkaloids—crystallizable aconitine, picra-aconitine (nearly inert), and a third amorphous alkaloid, which largely composes the bulk of the commercial aconitine.]

ADEPS—LARD.

[*The prepared internal fat of the abdomen of Sus Scrofa, Linné (Class Mammalia, Order Pachydermata), purified by washing with water, melting, and straining.*

OFFICINAL PREPARATIONS.

Adeps Benzoinatus, benzoinated lard (2 per cent. benzoin).

Oleum Adepis.

Lard is emollient and is sometimes used in frictions, but is chiefly employed in Pharmacy in the preparation of ointments and cerates. In obstetrical and gynæcological practice, lard is considered to be a universal lubricant, and is rarely absent from the lying-in chamber, where it is also used as a detergent to remove the *vernix caseosa* from the new-born. Washed lard is occasionally employed to prevent the eyelids from adhering in catarrhal conjunctivitis.]

ÆTHER—ETHER.

[*A liquid consisting of about* 74 *per cent. of ethyl oxide and* 26 *per cent. of alcohol containing a little water.*

Used in preparing Acidum Tannicum, Ceratum Sabinæ, Oleoresina Capsici, Oleoresina Cubebæ, Oleoresina Filicis, Oleoresina Lupuliæ, Oleoresina Piperis, and Tinctura Opii Deodorata.

OFFICINAL PREPARATIONS, U. S.

Æther Fortior—stronger ether, a liquid composed of about 94 per cent. of ethyl oxide, and 6 per cent. of alcohol containing a little water. (For producing anæsthesia.)

Oleum Æthereum (æther fortior and heavy oil of wine equal parts), used in preparing Compound Spirits of Ether.

Spiritus Ætheris (æther fortior 30, alcohol 70. Dose, ♏x–ʒi (.60 to 4. Gm.).

Spiritus Ætheris Compositus (æther fortior 30, alcohol 67, oleum æthereum 3). Dose, ♏x–ʒ (.60 to 4. Gm.), Hoffmann's Anodyne. The dose is ♏x–ʒj (.60 to 4. Gm.) in cold water or syrup.

Æther fortior is used in preparing Aconitina, Atropinæ Sulphas, Collodium, Collodium cum Cantharide, Oleum Æthereum, and Oleoresina Zingiberis.]

LOCAL ACTION.

Physiological.	*Therapeutical.*
The projection on the skin of a very fine spray of specially pure ether, by means of Dr. Richardson's ingenious instrument, causes at first a sensation of extreme cold, attended occasionally by the formation of frost. In about a minute, or even less, to this succeeds a sudden blanching of the service, the skin becoming hard and quite insensible, and a sharp cutting pain, like a burn, being at the same time experienced. If the action is kept up for some time, redness, tingling, vesication, and even sloughing may be produced. Be careful always to procure the pure anæsthetic ether, which has a low boiling point, and evaporates rapidly, as ordinary qualities of the drug are of no use for local anæsthesia.	Advantage has been taken of the insensibility to pain produced by the ether spray, to use it extensively during the performance of many minor operations, and more especially in those which consist merely of a single cut or prick. Under these conditions it acts admirably, but the hard and brawny state of the integument produced by its action renders it of little or no aid where dissection or manipulations of deep-seated structures are required. Further objections to its use are the acute pain attending application, and the subsequent redness, tingling, and irritation of the skin [and possible sloughing]. It has also been recommended as a sedative in *neuralgia*, and as a convenient means of applying intense cold; and cases of its successful employment in *chorea*, applied to the upper part of the spine, have been recorded.

INTERNAL ACTIONS.

Ether, when taken internally, is stimulant and antispasmodic.	It is therefore a useful remedy in *hysteria*, *flatulence*, *spasmodic asthma*, etc.

Combined Internal and External Use.

Physiological.

Ether has powerful anæsthetic properties, and differs from chloroform in the following respects: It increases instead of diminishing the arterial pressure, and acts as a tonic to the heart, which continues to pulsate in fatal cases after the arrest of breathing. The following is the order of involvement of the nerve centres:—

1. The cerebrum.
2. The sensory centres of the cord.
3. The motor centres of the cord.
4. The sensory centres of the medulla oblongata.
5. The motor centres of the medulla.

Therapeutical.

The stimulant action of ether on the heart has caused its use to be warmly advocated as in all respects superior to chloroform. It cannot, however, be considered absolutely safe, and it labors under several disadvantages, such as the greater length of time required to produce anæsthesia, the violent struggling occasionally observed, the disagreeable smell of the drug, etc.; and the greater tendency to hemorrhage during its administration. Gubler expresses a strong preference for chloroform as being more convenient, and as some persons, according to him, cannot be brought under the influence of ether. Some French authorities have described pneumonia and bronchial irritation as following the inhalation of ether. 13 deaths have been collected by Mr. Cawtley Dawson, of Leeds (*Brit. Med. Journal*, March, 1878), as having been caused by its use, with probably five in America, the fatal result having occurred from asphyxia, probably caused by the intense cold produced by the ether contracting the small blood-vessels of the lungs to an injurious degree.

Mode of Administration.

It is most important that no air be admitted during ether administration, as most violent resistance and dangerous struggling supervene if the vapor be not inhaled in a state of purity. Non-attendance to this point caused ether to fall into discredit soon after its original introduction, and it is only lately that we have been fully convinced that, by using this simple precaution, we may readily obtain complete anæsthesia and perfect muscular relaxation in from three to eight minutes. Various inhalers have been devised to fit tightly over the mouth and nose, and it is here essential that some instrument of the kind should be used.

When operating by artificial light, do not forget the inflammable nature of the vapor of ether.[1]

Æther Aceticus—Acetic Ether—Acetate of Ethyl, U. S.

Dose, gtt. xv–30. (0.9–1.9 C. C.) Is a constituent of Spiritus Odoratus and of Tinctura Ferri Acetatis. It is locally irritating. It can be used as an anæsthetic (H. C. Wood), but is slow in its action. Upon the system, it acts like æther, being stimulant and antispasmodic. It has been applied, with friction, to relieve pains in joints.

[For Mr. Clover's observations upon the Choice of Anæsthetics, see page 59.]

[Ætherea—Ethers.

The officinal Ethers are :—

Æther.
Æther fortior.
Chloroformum Purificatum.
Oleum Æthereum.]

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[1] [The relative danger from the use of the vapor of ether and of chloroform may be inferred from the fact that while the former is administered with impunity without any admixture with air, the latter requires to be diluted with from 95 to 97 per cent. of air, and even then the patient must be carefully watched.]

ALCOHOL—ALCOHOL.

[*A liquid composed of 91 per cent. by weight (94 per cent. by volume) of Ethyl Alcohol, and 9 per cent. by weight (6 per cent. by volume) of water. Sp. gr. 0.820 at 15.6° C. (60° F.) and 0.812 at 25° C. (77° F.).*

OFFICINAL PREPARATIONS, U. S.

Alcohol Dilutum. (One-half water.)

Spiritus Vini Gallici. Brandy (about 50 per cent. alcohol). Obtained by the distillation of fermented grapes, and at least four years old.

Spiritus Frumenti. Whisky (about 50 per cent. alcohol). Obtained by distillation of fermented grain (usually corn, wheat, or rye), and at least two years old.

Spiritus Myrciæ. Bay rum (for external use).

Spiritus Odoratus. Cologne water (for external use).

Alcohol makes a good menstruum, and is the basis of the SPIRITS and TINCTURES of the Pharmacopœia; the former being solutions of volatile substances in alcohol, the latter generally containing the active principles of plants obtained by maceration and percolation.

Vinum Album. White wine. A pale, amber-colored or straw-colored, alcoholic liquid, made by fermenting the unmodified juice of the grape, free from seeds, stems and skins. Alcoholic strength 10–12 per cent.

Vinum Album Fortius. Stronger white wine. Alcoholic strength 20–25 per cent.

Vinum Rubrum. A deep red alcoholic liquid made by fermenting the juice of colored grapes in presence of their skins. Alcoholic strength 10–12 per cent.

Vinum Aromaticum. Aromatic wine (for external use). (See p. 95.)

(**Spiritus Genevæ**, Gin, is not officinal; the Spiritus Juniperi Compositus of the Pharmacopœia may be regarded as its equivalent.)

TESTS.

The chemical *test* consists in removing the contents of the stomach, mixing them with distilled water, filtering, and distilling in union with carbonate of potassium or sodium; the product is mixed with fused chloride of sodium, and again distilled. Alcohol, if present, will be found in the receiver.]

ANTIDOTES.

The treatment of acute alcoholic poisoning must consist in removing all the spirit from the stomach by means of the stomach-pump, and endeavoring to rouse the patient from his perilous state of coma by cold affusions, strong coffee, surface stimulation and galvanism, whilst artificial respiration may be employed to stimulate the flagging breathing powers. In more chronic cases, withdraw all stimulant absolutely and at once; insure sleep by chloral and bromide of potassium; and try to diminish the morbid craving by capsicum, nux vomica, the mineral acids, and a liberal and varied diet.

LOCAL ACTIONS.

Physiological.	*Therapeutical.*
Alcohol has some external astringent properties from its power of hardening albumen and thus condensing the tissues, whilst, from its rapid evaporation, it produces a cooling effect. [By its constringing effects upon the smaller vessels and nerves, it checks active congestion, reduces inflammatory action, and relieves pain.]	This hardening process has been turned to practical account for the prevention of bedsores, and alcohol is also a usual ingredient in the now somewhat old-fashioned spirit or evaporating lotions. [Alcohol has been used with great success by Ollive (La France Médicale, No. 28, 1882) as a topical application for acute inflammation of cellular tissue; pure concentrated (80° or 90°) alcohol being applied on compresses of cotton wadding, and frequently renewed. There is marked relief of pain, and the inflammation is decidedly retarded or aborted.[1]]

INTERNAL ACTIONS AND USES.

1. *On Brain and Nervous System.*—Alcohol primarily stimulates the cerebral cen-	1. A moderate quantity of alcohol stimulates the mental faculties, whilst larger doses

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[1] [Phila. Med. Times, 1882, p. 459.]

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tres by dilating their arteries, and so admitting more blood; secondly, excitement supervenes with impaired muscular co-ordination, and finally coma, which may prove fatal if the dose taken be sufficiently large. Whilst it may also in small doses stimulate the spinal cord, in larger quantities it undoubtedly weakens the functions of this structure, causing indisposition for active exertion, as well as actual want of power. This has been proved by the experience of campaigns, but more especially that in Ashantee, where it was found that alcohol distinctly diminished the power of bearing fatigue, and also by the experiments of Parkes, which showed most conclusively that 2 or 3 ounce doses of spirit given several times per diem to a couple of healthy men engaged in laborious work, caused a slight primary increase of energy, but a secondary well-marked indisposition for muscular exertion, with actual diminution of bodily vigor. Dr. Wilks has also drawn attention to a remarkable series of cases in which paraplegia, and numbness, anæsthesia and violent shooting pains have been caused by the excessive and long-continued use of alcohol.

On the sympathetic system, the effects are somewhat become narcotic and even anæsthetic. In chronic nerve debility, as in *neuralgia*, we may often relieve pain by the use of stimulants; but these are precisely the class of cases in which habits of intemperance are most readily formed.

Nothing seems better proved than the fact that alcohol lessens the capacity for actual muscular exertion, and it is therefore well to advise sportsmen, soldiers, and others, who are about to undergo severe bodily fatigue, to reserve any stimulant until their day's work is over, when it may be of real service. In the Ashantee campaign, a ration of rum, on reaching camp at night, seemed to revive the men after their labors.

In those cases of chronic alcoholic poisoning described by Wilks, we must follow his advice, and entirely cut off all supplies of strong drink.

varied; for although the dilatation of certain vascular areas must depend on paralysis of these nerves, there seems no doubt that, as Binz has shown, alcohol in inflammatory conditions stimulates the sympathetic, contracts the arterioles, and prevents that migration of the white corpuscles which constitutes the essence of this morbid process. The chronic abuse of alcohol causes nervous tremors and debility, gradually leading up to that semi-maniacal state known as delirium tremens, in which the victim is haunted by the constant presence of spectral illusions, preventing sleep, and finally wearing him out, if unchecked. The brain, like most of the internal organs of the body, suffers in alcoholism from the contraction of new areolar tissue pressing upon and obliterating some of the nervous elements.

2. *On Heart and Circulation.*—Alcohol in moderate doses has a stimulating influence on the heart; and dilatation of the peripheral vessels and of those of the brain is produced.

In chronic alcoholism we find a degenerated condition of the larger vessels, known as atheroma.

This is, no doubt, one explanation of the beneficial action of alcohol in some cases of acute inflammation.

The treatment of delirium tremens consists most essentially in withholding all stimulant, in keeping the patient in a cool, quiet, dark room, in forcing him to take small and oft-repeated supplies of nourishment, and in cautiously prescribing narcotics, of which chloral hydrate is the best. [For this condition, strychnine or tincture of nux vomica often proves of great value.]

2. To its action on the circulation, however, we must ascribe a good deal of the beneficial influence of alcohol in the treatment of disease. When the powers of life show signs of failing, when the first sound of the heart grows weak, the pulse feeble, compressible, and irregular, when syncope threatens, and delirium is beginning, the indications for the administration of alcohol are complete, and

3. *Respiration and Temperature.*—The old observations of Liebig seemed to show that alcohol was a respiratory food, and was largely burnt off in the lungs, thus aiding in the production of animal heat. It is now found, however, that under its use the carbonic acid given off from the lungs is diminished, and that the body heat is lowered. The carbonic acid, however, is probably only apparently diminished, because it is retained in the blood. When but small doses are taken, only a slight cooling effect is produced, whilst large quantities may reduce the temperature by two or three degrees, the explanation being partly that the dilatation of the cutaneous

it will be found to act well when the tongue moistens, the pulse gains in volume and regularity, sound refreshing sleep is obtained, and the temperature falls. It is, of course, difficult to lay down exact rules as to the precise stage of fevers at which we may best prescribe alcohol, but ordinarily we should do so in *typhus* about the seventh day, in *typhoid* the twelfth, in *smallpox* when the secondary fever is developed, and in acute inflammations, generally, when the heart begins to fail, and the nervous system to show indications of debility.

3. This lowering of temperature must also be explained by diminished tissue metamorphosis, and by a partial arrest of the oxygen-bearing function of the red corpuscles of the blood, as well as by the paralyzing influence of the alcohol on the protoplasm of the heat-producing cells, as illustrated by the way in which it checks the action of yeast (Binz).

That some of this action is chemical is proved by the fact that alcohol lowers post-mortem temperature. It is therefore evident that we must warn persons about to be exposed to severe cold of the fallacious nature of the old notion that alcohol furnishes true warmth.

There can, however, be no

vessels enables more blood to be removed from the heat-producing centres, spread out and cooled in the wide sheet of the superficial circulation, and then returned, to abstract more warmth from the internal organs. Another curious fact is that alcohol also diminishes the power of resistance to cold; and this has been proved not only by the experience of Arctic voyagers, but by the following experiment: If we place two animals, one of which has been dosed with alcohol, in a chamber of which the temperature has been reduced to 10° below freezing point, both will speedily be benumbed to sleep; but whilst the healthy animal will be supported by the combustion of its tissues and survive the shock, its companion will perish from this heat-producing process being interfered with by the spirit.

4. *Intestinal Tract.*—In small doses, alcohol stimulates the appetite and increases the supply of gastric juice: but if given in larger quantities, this secretion is checked, nausea is produced, and the desire for food disappears. In the advanced stages of chronic alcoholism the stomach is injured by the contraction of the new areolar tissue obliterating its glands, and hence we find dyspepsia,

doubt that we may often alleviate the evil effects of a chill by a dose of spirit [especially in the form of a hot toddy], which releases the capillaries of the skin from their state of morbid contraction, and thus prevents congestion of internal organs. As an antipyretic, alcohol can hardly be used with safety, as at least two ounces of absolute alcohol are required to lower the temperature of an adult.

4. Alcohol is thus often beneficial in the case of weakly persons, and more especially at the extremes of life, by giving tone to the digestive organs and aiding the due assimilation of food. Although its use is by no means essential to the healthy, it is of great service to dwellers in large towns, and others whose mode of life involves much mental strain. We must invariably lay down the rule

with morning vomiting, a very common symptom in drunkards.

5. *Secreting Organs.*—Alcohol stimulates the liver, and this organ is one of the first to suffer from chronic abuse of stimulant, the areolar tissues being irritated, and an increased formation taking place, which gives a primary

that, save in illness, alcohol should never be taken on an empty stomach, that the freer dilution in which it is imbibed the better, and that two ounces per diem should be about the limit of quantity. Although some persons seem to get on better without anything stronger than water, others are undoubtedly benefited by a moderate allowance, and the present state of science does not allow us to give dogmatic opinions on the general questions involved, without the careful study of individual constitutions.

Binz values alcohol as a food in fevers, not as actually building up the tissues directly, but as an easily burning fuel, from whose combustion, in oft-repeated small doses, the heat required to generate vital force may be derived, sparing the reserve of fat in the body and producing force.

Frankland puts down the force-producing power of alcohol as 7 to coal 8; but we must not forget the limited power of the system to draw upon and utilize this fuel.

5. Rutherford found that pure alcohol had no effect upon the biliary secretion.

enlargement to the organ. These newly formed structures, however, having the tendency to shrink or contract, gradually obliterate the true secreting elements of the gland, which grows smaller and harder, ascites eventually following from pressure on the portal vein and obstructed return of blood from the abdominal circulation. Wine appears to retard salivary digestion.

The inhibitory influence of wines on starch digestion is caused by their acidity, and may be neutralized by the addition of an alkali.

Kidneys.—Alcohol has no specially well-marked effect on the urinary secretion, but the kidneys may also suffer from the cirrhotic degeneration just described.

Chronic kidney disease is, therefore, a very common symptom in the victims of intemperance.

MODE OF ELIMINATION.

Alcohol very rapidly enters the blood, and is rapidly given out, in small part at least by the breath, but it probably "undergoes combustion to a great degree in the body, maintains or increases the body weight, and prolongs life on an insufficient diet. It is therefore entitled to be reckoned as a food" (Brunton). Much discussion has been expended on its elimination or combustion, and some years ago the hopes of temperance agitators were much raised by the apparent results of experiments put forward by two French observers, which seemed to prove that all the ingested alcohol is given out unchanged in the urinary secretion. Anstie and Dupré, however, showed the fallacy of this by pointing out that even the urine of the most rigid abstainers contains a substance which cannot, by the chromic acid test, be distinguished from alcohol, and it has since been asserted that this may actually be alcohol derived from converted liver sugar.

Opinions differ much as to the ultimate destination of alcohol in the system. Some hold that it is first converted in the blood into aldehyde, then acetic acid, and finally carbonic acid and water. Wanklyn holds that it may be converted, partly at least, by oxidation into glycol.

Binz believes it to be completely destroyed in the organism, as he has never found more than three per cent. in the urine, and as, according to him, no secondary product has ever been found.

As regards the dose of alcohol, it is manifestly impossible to lay down any hard-and-fast rules, as we must of necessity be guided by the constitution of the patient and the symptoms of his special case. We may say that from two to eight ounces daily of brandy may be sufficient in typhus or any acute illness, and that 16 oz. may be looked upon as the quantity which it is well not to exceed. In a state of health, 2 oz. absolute alcohol per diem is usually considered a maximum allowance, every care being taken to insure purity. The adulteration with fusel oil causes headache and much digestive derangement; whilst picrotoxine, which is occasionally added to beer, will produce epileptiform seizures.

It is of some importance to consider the forms of alcohol best adapted for varying cases, and we may say, generally, that champagne acts well in sudden and rapid sinking, whilst good whisky or brandy may be recommended in ordinary acute illness. Port and Madeira are well suited for cases of debility; and in convalescence from acute illness and digestive feebleness, malt liquors and Burgundy [or the wine of Erythroxylon Coca, "Vin Mariani"] will often be found to be of great service; but we must always beware of the possibility of leading our patients into disastrous habits of self-indulgence by a lack of precision in our directions as to quantity.

The following are the relative proportions of absolute alcohol in the liquors most commonly in use:—

Brandy, gin, whisky	30 to 50	per cent.
Sweet Spanish and Italian wines . .	13 to 17	"
Hock and claret	8 to 11	"
Edinburgh ale	6	"
Bavarian beer	4 to 5	"
Stout	4	"

[**Spiritus Ætheris Compositus** is an alcoholic solution of ether, impregnated with oil of wine (stronger æther, 30; alcohol, 67; ethereal oil, 3 parts), and is popularly known as Hoffmann's anodyne liquor. It is used in *hysteria* and *nervousness.* Dose, ♏x to fʒj (.60 to 4. Gm.).] (See ÆTHER.)

[By the action of sulphuric and nitric acids upon stronger alcohol, nitrous ether is produced, which, in combination with alcohol, is called spirit of nitrous ether.

Spiritus Ætheris Nitrosi is "an alcoholic solution of ethyl nitrite ($C_2H_5NO_2$: 75) containing five per cent. of the crude ether" (the sweet spirit of nitre). This preparation, in doses of from 2 to 8 grammes (from ½ fl. drachm to 2 fl. drachms), is diuretic and diaphoretic, and is much used in feverish conditions.]

[ALLIUM—GARLIC.

The bulb of Allium sativum, Linné (N. O. Liliaceæ).

Dose, of the fresh bulbs, ʒj–ij (4 to 8 Gm.).

OFFICINAL PREPARATIONS, U. S.

Syrupus Allii. Dose, fʒj, or for an infant ♏v–x (.30 to 4. Gm.). (Garlic 15, dilute acetic acid 40, sugar 60 parts).

Garlic is a stimulant expectorant, and is used with good effect in the latter stages of *catarrhal bronchitis*, or suffocative catarrh in young children, in which cases it may also be used as a poultice to the chest. These poultices, composed of the freshly boiled bulbs pounded into a mass, used either alone or with an equal quantity of linseed meal, may also be used in infantile convulsions, applied to the back and legs, or the oil of garlic may be used as a rubefacient.

The following would be an appropriate formula for the catarrhal bronchitis of infants:—

℞.	Syr. allii	f℥j;	or	32	Gm.	
	" ipecacuanhæ	fʒiij;	"	12	"	
	" tolutani	fʒv;	"	20	"	
	" acaciæ	fʒvj;	"	24	"	
	Tinct. opii camphorat.	fʒij;	"	8	"	M.

S. Dose, ♏xx to fʒj.]

ALOE—ALOES.

[*The inspissated juice of the leaves of Aloes socotrina. Lamarck (N. O. Liliaceæ).*

Officinal Preparations, U. S.

Extractum Aloës Aquosum. (Watery extract.) Dose, gr. ss–v (.03–30 Gm.).

Aloë Purificata, purified aloes. Dose, gr. j–xx (.06 to 1.35 Gm.).

Pilulæ Aloës. (Aloes and soap, equal parts.) 2 grs. of aloes in each pill.

Pilulæ Aloës et Asafœtidæ. (Aloes, asafœtida, and soap, equal parts.) 1½ grs. aloes in each pill.

Pilulæ Aloës et Mastiches. (Aloes, 4 parts, mastic and rose leaves, āā 1 part.) 2 grs. in each pill.

Pilulæ Aloës et Myrrhæ. (Purified aloes, 2 parts, myrrh, 1 part, aromatic powder, ½ part.) 2 grs. in each pill.

Pilulæ Rhei Compositæ. (Each pill contains purified aloes gr. jss, rhubarb gr. ij, and myrrh gr. j, with oil of peppermint.)

Pilulæ Aloës et Ferri. (Purified aloes, sulphate of iron and aromatic powder, āā gr. j, in each pill.)

Tinctura Aloës. (10 per cent.) Dose, fʒss–ij (2 to 8 Gm.).

Tinctura Aloës et Myrrhæ. (Purified aloes and myrrh, each 10 per cent.) Dose, fʒss–ij (2 to 8 Gm.).

Vinum Aloës. (Aloes, 6 parts, cardamom 1, and ginger 1, in 100 parts of stronger white wine.) Dose, fʒj–iv (4–16 Gm.).

Aloes enters into Tinctura Benzoini Composita (2 per cent.), and Extractum Colocynthidis Compositum (50 per cent.).]

Physiological Action.

Aloes acts on the lower part of the large intestines, stimulating its peristaltic movements, and causing the evacuation of formed and only slightly softened feces. It also increases the secretion of bile, being, in large doses, a very powerful stimulant of the

Therapeutical Action.

Aloes is a very certain, efficient, and mild purgative [in doses of ten to twenty grains], acting, however, rather slowly, and seldom producing its effects before from six to twelve hours.

It occasionally, however, gripes, and is, therefore, liver. It renders the bile more watery, but at the same time increases the secretion of biliary matters by the liver, and some authorities hold that its purgative action is merely secondary to this. A good deal of congestion about the rectum is produced, and a sympathetically stimulating effect may extend to the uterus, and tend to excite its functions, whilst chronic piles even may be benefited by its stimulating influence.

[The active principle is termed ALOIN, which is sometimes used instead of aloes in from one-half to one-third of the dose. "Its cathartic action is said to be uniform, rather more speedy than that of crude aloes, and unattended by griping."[1]]

usually given in combination with other remedies which diminish this tendency, and, from its action on the lower bowel, it must be avoided in any local inflammatory condition, or in the acuter forms of hæmorrhoids. Oppolzer [and Fordyce Barker] recommended aloes, as below.

Its mild and slow action has caused it to be much used in dyspepsia; it forms a principal constituent of most dinner pills; and it is also a popular remedy in habitual constipation. It has also emmenagogue properties depending partly, no doubt, on the sympathy of contiguity. In the form of pill or decoction, and given, as laid down by Graves, at the time when the catamenia are naturally expected, it often proves most efficient. [The purified aloes should be used, as the commercial aloes contains impurities.]

DOSE, ETC.

The most useful preparations of aloes are, the compound decoction (P.Br.), dose f℥j to f℥ij;[2] the pil. aloes et myrrhæ; and aloes and iron, dose gr. v to xv (.30 to 1. Gm.).

℞. Ferri sulph.	gr. xx;
Ext. aloes aq.	ʒj;
Extracti taraxaci	q. s.

M. Div. in pil. lx.
One morning and evening.

Oppolzer.

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[1] The National Dispensatory, Phila., 1879, p. 137.

[2] [This is a favorite preparation of the British Pharmacopœia. It contains aloes, licorice, carbonate of potassium, myrrh, saffron, and tincture of cardamom, and is gently cathartic.]

[For chronic constipation :—

R. Ext. belladonnæ alc.	gr. $\frac{1}{12}$; or	005 Gm.
" colocynth. comp.		
Aloës, āā	gr. jss; "	09 "
Ol. anisi	♏j "	06 "

Ft. pilula et mitte tales No. xij.
S. Dose two or three at bedtime.

For chronic constipation, in women with uterine disorder :—

℞. Aloës purificat.	gr. ij; or	12 Gm.
Ferri sulphat.		
Terebinth. alb., āā	gr. j; "	06 "

Ft. pil. sec. art.
S. Dose, one or two pills per diem.

Pulvis Aloes et Canellæ (Pharm. 1870) is no longer officinal, though still used as an emmenagogue in doses of ten or twenty grains. It contained Aloes, 8 parts; Canella bark, 20 parts. It is sometimes called for by the vulgar name Hickory-piccory (Hiera-picra).

Infusions or suppositories of aloes may be used against ascarides.]

[ALTHÆA—MARSHMALLOW.

The root of Althæa officinalis, Linné (N. O. Malvaceæ).

OFFICINAL PREPARATION.

Syrupus Althæa (4 per ct.) used as a vehicle.

Marshmallow is a demulcent, as it contains chiefly mucilage and starch. It contains no tannin, but has about 2 per ct. of Asparagin, an organic principle with diuretic properties. It is occasionally exhibited as a decoction in fevers, or inflammation of mucous membranes. In the form of a confection it is popular as a pectoral. The syrup is a new introduction into the Pharmacopœia as a vehicle for cough mixtures. It should be freshly made.]

ALUMEN—ALUM.

[Potassa Alum.]

Dose, as an emetic, gr. x to xx (.60 to 1.30 Gm.), or, as a purgative, gr. xv to ʒj (1. to .4 Gm.).

Alumen Exsiccatum. Dried alum. Dose, gr. v–x (.30 to .65 Gm.).

Aluminii Hydras. Hydrate of Aluminium. Dose, gr. iij–xx (.20 to 1.30 Gm.).]

LOCAL ACTION.

Physiological.	*Therapeutical.*
Alum, used externally, tends, like most astringents, to contract the bloodvessels and condense the tissues by coagulation of their albumen.	It is, therefore, much employed as an astringent lotion in *conjunctivitis*, *leucorrhœa*, *gonorrhœa*, and as a gargle in sore throat. [Dried alum is a mild escharotic for exuberant granulations, etc.]

INTERNAL ACTIONS AND USES.

1. *On Nervous System.*—Alum seems to have some power in relieving spasmodic action.	1. It is, therefore, beneficial in some cases of *whooping-cough*, and in *colica pictonum*. [In *whooping-cough* it is given in small doses of gr. j–ij (.06 to .12 Gm.), in syrup and water several times daily. It is also one of the best direct emetics in *croup*. Dose, ʒss (2 Gm.), repeated every half hour if necessary.]
2. *Circulation.*—This, no doubt, is intimately connected with No. 1, as the contraction of the bloodvessels and internally astringent effects which follow the use of alum are probably dependent on nervous influence.	2. Alum has been used for internal *hemorrhage*, and to check *excessive sweating*, and its action in *whooping-cough* is also largely due to its astringent properties, as it is most useful in the later stages, when profuse secretion has been established.
3. *On Secretion.*—Alum occasionally acts both as an emetic and a purgative.	3. This also explains its use in *colica pictonum*.

USE.

In lotion, gr. ij ad x, or :—

℞.	Aluminis	gr. x;	or	60	Gm.
	Aquæ rosæ	fʒiv;	"	128	" M.

Lotion in *catarrhal ophthalmia.*

℞.	Aluminis	ʒij;	or	8	Gm.
	Acidi sulphurici dil.	fʒj;	"	4	"
	Syrupi limonis	f℥j;	"	32	"
	Aquæ	f℥iij;	"	96	" M.

S. Capiat cochleare magnum secundâ quâque horâ.

In *colica pictonum.*

As a purgative, gr. xl to ʒj.

Glycerinum aluminis is a recent addition to the Br. P.

[Dried alum may be given in pill, gr. ij (.12 Gm.), in *hæmoptysis.*]

[ALUMINIUM SULPHAS—SULPHATE OF ALUMINIUM.

$Al_2(SO_4)_3 18H_2O$; 666.

The sulphate of aluminium is antiseptic and astringent. It is sometimes employed in 2 to 5 per cent. solutions, as an injection in gonorrhœa and leucorrhœa. It has also been used to fill carious teeth; and in solution is employed to inject and preserve subjects for dissection.]

[AMMONIACUM—AMMONIAC.

A gum-resin obtained from Dorema Ammoniacum, D. (N. O. Umbelliferæ, Orthospermæ).

OFFICINAL PREPARATIONS, U. S.

Mistura Ammoniaci. (4 per cent. emulsion.) Dose, f℥ss (16 Gm.).

Emplastrum Ammoniaci. (Ammoniac treated with acetic acid.)

Emplastrum Ammoniacum cum Hydrargyro. (Ammoniac 72, mercury 18, with lead plaster, sublimed sulphur, diluted acetic acid, and olive oil.)

INTERNAL EFFECTS.

Ammoniac may be used in *chronic bronchitis* with defective secretion, but its systemic influence is not very evident. It is given in substance (dose gr. x–xxx) or rubbed up with water so as to form the Mistura Ammoniaci, or milk of ammoniac. The pills (squills gr. ss, ginger, ammoniac, āā gr. ij with soap), not now officinal, are expectorant and stimulating. The plasters are resolvent and mildly counter-irritant, being useful in enlarged joints and scrofulous tumors.]

AMMONIA—AMMONIA.

[OFFICINAL PREPARATIONS, U. S.

Aqua Ammoniæ Fortior. (Contains 28 per cent. by weight of the gas.)

Aqua Ammoniæ. (Contains 10 per cent. by weight of gaseous Ammonia.) Dose, ♏ij–v (.13 to .65 Gm.).

Linimentum Ammoniæ. (Aq. Ammon. 30, cotton-seed oil 70.)

Liquor Ammonii Acetatis. (Spirit of Mindererus.) Contains about 7½ per cent. of this salt. Dose, f℥ss–j (16. to 32. Gm.).

Spiritus Ammoniæ. (10 per cent. solution in alcohol.) Dose, ♏x–xv (.60 to 1. Gm.).

Spiritus Ammoniæ Aromaticus. (Contains Ammonium Carbonate 4 per cent.) Dose, fʒss–j (2. to 4. Gm.).

Ammonii Benzoas. Dose, gr. x–xx (.60 to 1.30 Gm.).

Ammonii Bromidum. Dose, gr. x–xv (.60 to 1. Gm.).

Ammonii Carbonas. Dose, gr. x (.60 Gm.), as an emetic gr. xxx (2 Gm.).

Ammonii Chloridum. Dose, gr. v–xx (30 to 1.30 Gm.).

Ammonii Iodidum. Dose, gr. v–x (.30 to 1.30 Gm.).

Ammonii Nitras (used in making Nitrous Oxide).

Ammonii Sulphas (used in making Ammonio-ferric Alum).

Ammonii Phosphas. Dose, gr. v–xx (.35 to 1.30 Gm.).

Ammonii Valerianas. Dose, gr. ij–v (.12 to .30 Gm.).

Ferri et Ammonii Citras. Dose, gr. v–x (.30 to .65 Gm.).

Ferri et Ammonii Sulphas. Dose, gr. iij–x (.18 to .65 Gm.).

Ferri et Ammonii Tartras. Dose, gr. x–xxx (.65 to 2. Gm.).

Hydrargyrum Ammoniatum, used in ointment.]

Trochisci Ammonii Chloridi (each containing two grains).

Also enters into Tinctura Guaici Ammoniata, Tinctura Valerianæ Ammoniata and Glycyrrhizinum Ammoniatum.]

POISONING.

If given in large quantities, ammonia may cause death by inflammation of the stomach and intestines; and, according to Richardson, it may also kill by dissolving the red corpuscles of the blood.

[ANTIDOTES.

Vegetable acids and demulcents. The fixed oils may be administered, and the usual after-treatment instituted for poisoning by the caustic alkalies.]

LOCAL ACTION.

Physiological.	*Therapeutical.*
The stronger preparations of ammonia are irritating to the skin, causing redness and speedy vesication on account of their power of dissolving the cuticle.	Ammonia is, therefore, a component part of many stimulating liniments, and is an excellent counter-irritant and vesicant. It is a good application to the sting of insects or the bite of poisonous snakes.
Chloride of ammonium, on the other hand, is rather soothing, and cools the skin by aiding the speedy evaporation of fluids.	Chloride of ammonium used to be an invariable ingredient in evaporating lotions.
The vapor of ammonia is stimulating and irritating.	Ammonia is used by inhalation in *syncope*, and as an

aid in the restoration of persons poisoned by prussic acid; but care must be taken not to allow its vapor to enter the air-passages too freely during unconsciousness, or serious inflammation may be produced.

CONSTITUTIONAL ACTIONS AND USES.

I. *On Brain and Nervous System.* — The preparations of ammonia, generally speaking, are stimulant in their action, affecting, however, rather the ganglionic and spinal systems than the brain proper, and thus differing from alcohol.

I. Ammonia in its various preparations is very largely used as a stimulant in many cases of exhaustion and debility. It is the best means of combating the depressing influence of *snake-bite;* it is invaluable in *bronchitis, pneumonia,* and all *typhoid conditions,* being more diffusible and less stupefying than alcohol; whilst in *prussic-acid poisoning* it may be administered internally as well as externally.

Chloride of ammonium has, according to Anstie, the property of giving increased tone to sensory nerves.

Chloride of ammonium is very serviceable in many cases of *neuralgia,* and in those wearing muscular pains in hard-worked women and others usually described under the term *myalgia.* [Ammonium bromide has been used by Da Costa in acute rheumatism in doses of gr. xx-xxx, three or four times daily.]

II. *Circulation and Respiration.*—Ammonia increases the force and frequency of the heart's action, this explaining some part of its

II. It is therefore a very generally used stimulant in acute disease.

stimulating influence. It may also aid the respiratory power by stimulating the respiratory centre, and giving tone to the muscular fibres surrounding the bronchial tubes.

When injected into the blood, ammonia has the power of dissolving the red blood corpuscles as well as of interfering with their oxygen-carrying functions. [In cases of fatal ammonia poisoning, the blood, after death, is found to be dark and to contain very little oxygen, nor will it absorb the gas and become arterialized when agitated in an atmosphere of pure oxygen. The red blood-corpuscle is also found to be altered and to show unusual resistance to the action of acetic acid.] And it is also supposed to diminish the coagulating property of the blood and to assist in the solution of fibrinous concretions already formed.

III. *On Secretion.*—Under this head it may be convenient to place—

1. The *emetic* action which is especially developed by large doses of carbonate of ammonia. This effect is also produced by injection into the blood.

2. Ammonia increases the secretion from the bronchial mucous membrane.

It has therefore been used with success by Richardson in those cases where, as after delivery, *diphtheria*, *ovariotomy*, etc., a clot is forming in the heart, and he recommends it by injection into the veins, stopping short of solution of the red corpuscles.

1. Carbonate of ammonia is used as an emetic to assist in clearing the air-passages from accumulated mucus, and in some cases of poisoning.

2. This, in addition to the stimulant action, explains the great power of ammonia over *bronchitis* in the weak,

	young, or aged, and the later stages of *pneumonia*, where it promotes expectoration by thinning and rendering the sputa less tenacious.
3. *Intestinal.* — Ammonia in large doses increases the secretion from the intestines, and may cause diarrhœa, and it also neutralizes acid secretions.	3. It is never used as a purgative; but this irritating action on the bowels may render it an undesirable form of stimulant in enteric fever. It is a useful antacid.
4. *Cutaneous.*—Ammonia, more especially in the form of liquor ammonii acetatis, acts freely on the skin.	4. Liquor ammonii acetatis is one of our best diaphoretics in a great variety of feverish conditions.
5. *Urinary.*—No special action. [The urine becomes more acid, possibly because of oxidation of ammonia in the system (Bence Jones); the urea is increased.]	5. Chloride of ammonium has been successfully used in intermittent hæmaturia.

Finally, ammonia has been employed under various conditions which cannot conveniently be grouped under any precise physiological heading; but these we will consider when we refer *seriatim* to the various preparations of the drug.

MODE OF ELIMINATION.

Ammonia is very rapidly given out from the system, principally by the urine, also, to a less degree, by the breath and sweat.

PREPARATIONS.

Aqua ammoniæ fortior and aqua ammoniæ[1] are seldom used internally, but occasionally, as mentioned above, by vapor and injection.

Ammonii carbonas. This is the most active and efficient preparation, used as a stimulant in doses of from 3 to 10 grs., as emetic 30 grs. Some authors have looked upon ammonii carbonas as a specific for *scarlet fever*, but of the soundness of this view no sufficient evidence has been pro-

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[[1] Syrup of senega contains 4 parts of water of ammonia in a thousand.]

duced. It is nauseous and pungent, and must be well disguised, milk being a good vehicle.[1]

℞.	Ammonii carbonatis	gr. xl ;	or	2	50 Gm.
	Tincturæ scillæ	fʒij ;	"	8	"
	Syrupi tolutani	fʒiij ;	"	12	"
	Decocti senegæ	f℥vij ;	"	224	"

Misce, fiat mistura.
S. Capiat unciam unam quartâ quâque horâ.

Stimulating expectorant.

[Raspail's *eau sedatif* (composed of aqua ammoniæ f℥ij, sodii chloridum ℥ij, spiritus camphoræ ʒiij, aqua ℥xxxij) is a sedative application for neuralgia.]

Spiritus ammoniæ aromaticus contains nutmeg, lemon, and spirit in addition to the ammonia. [This is an agreeable preparation either for inhalation or internal administration.]

Ammonii chloridum. Used as a tonic in neuralgia, in doses of from 20 to 30 grs.; but it is very nauseous, resembling sea-water in flavor. It is also a common addition to expectorant cough mixtures.

℞.	Ammonii chloridi	ʒij ;	or	8	Gm.	
	Ext. glycyrrhizæ	℥ss ;	"	16	"	
	Syrupi tolutani	f℥j ;	"	32	"	
	Aq. cinnamomi	ad f℥viij ;	"	256	"	M.

S. Capiat unciam unam quartis horis.

In *neuralgia* or *bronchitis*.

It has also, but with little real foundation, been supposed to possess some power of aiding the absorption of lymphatic and glandular enlargements, and has been regarded as a good remedy in chronic liver disease, and in *hepatitis* and *hepatic abscess*. [It increases the flow of bile, according to Ringer.]

Ammonii bromidum seems to have an occasional and uncertain influence over *whooping-cough*, and is thought by some to be a good substitute for bromide of potassium in *epilepsy* and other nervous disorders.

Liquor ammonii acetatis and liquor ammonii citratis P. Br. are diaphoretic in doses of from fʒij to f℥j (8 to 32 Gm.).

℞.	Liq. ammonii acetatis	f℥ij ;	or	64	Gm.	
	Syrupi limonis	f℥j ;	"	32	"	
	Sp. ætheris nitrosi	fʒiij ;	"	12	"	
	Infusi serpentariæ	ad f℥viij ;	"	256	"	M.

S. Cap. f℥j quartis horis.

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[1] [Carbonate of ammonia is incompatible with syrup of squill or syrup of garlic, as they contain acetic acid.]

AMYGDALA AMARA—BITTER ALMOND.

The seed of Amygdalus Communis, variety amara, Linné (N. O. Rosaceæ, Amygdaleæ).

AMYGDALA DULCIS—SWEET ALMOND.

The seed of Amygdalus Communis, variety dulcis, Linné (N. O. Rosaceæ, Amygdaleæ).

OFFICINAL PREPARATIONS, U. S.

From the bitter almond:—

Oleum Amygdalæ Amaræ. Dose, gtt. ¼ (.01 Gm.), in emulsion.

Aqua Amygdalæ Amaræ. (1 in 1000.) A flavored water. Dose, ʒj–ij (4.8 Gm.).

Syrupus Amygdalæ. As a vehicle (Orgeat syrup).

From the sweet almond :—

Mistura Amygdalæ. As a vehicle.

Oleum Amygdalæ Expressum (a bland oil; dose, ʒj–ij, as a laxative).

Unguentum Aquæ Rosæ.

Oil of bitter almond, or benzyl aldehyde, is produced as the result of the reaction of emulsion on amygdalin in aqueous mixture; it therefore does not pre-exist in the almond, and cannot be obtained from sweet almond, because amygdalin is not present in the latter (Remington). Hydrocyanic acid is also formed in the same reaction. Artificially made oil of bitter almond is free from prussic acid.

The antidotes to poisoning by the preparations of bitter almonds are the same as those of hydrocyanic acid.

The effects of the oil of bitter almonds upon the system are said to be sedative, but as it is likely to be contaminated by the presence of hydrocyanic acid, the poisonous symptoms manifested will be those of hydrocyanic acid. Bitter almond water, and the syrup, are used as vehicles for cough mixtures.

The bitter almond, being uncertain and dangerous, is never used in medicine; but sweet almonds, in the form of the mixture or of powder, are of value as agreeable vehicles for the mixture or suspension of other drugs; and Dr. Pavy has taken advantage of their nutritive properties to propose them as a substitute for bread in saccharine diabetes.

AMYL NITRIS—NITRITE OF AMYL
($C_5H_{11}NO_2$; 117).

[*A clear, pale-yellowish liquid, of an ethereal, fruity odor, an aromatic taste and a neutral or slightly acid reaction. Insoluble in water, soluble in alcohol, ether, chloroform in all proportions.*]

LOCAL ACTION.

Nitrite of amyl is not possessed of any local irritant or sedative properties.

INTERNAL ACTIONS.

Physiological.	*Therapeutical.*
I. *Nervous System.* — 1. *On Brain.*—No special effect is produced on this organ beyond that resulting from dilatation of the cerebral vessels, and consisting of a sensation of fulness and oppression in the head, throbbing, with giddiness and confusion of ideas. Crichton Browne has observed yawning and other movements suggesting a specific action on the motor centres of the mouth.	I.—1. It has been recommended as a remedy for epilepsy, in virtue of its dilating powers releasing the vessels of the brain from that condition of partial spasm which is said to be the cause of the disease. When given during the fit, it fails; but the experience of Crichton Browne, confirmed by Weir Mitchell and others, shows that it has been successful, when given before the paroxysm, when a distinct aura is felt, and pallor of the face observed, indicating anæmia of the brain from vascular spasm. It is also of service in that perilous condition known as the status epilepticus. It has also been used with some success in migraine.
2. *On Spinal Cord.*—A distinct lowering of reflex irritability has been observed to follow its use.	2. It has been theoretically recommended in cases of tetanus and strychnine-poisoning; and, in neuralgia,

II. *Vascular System.*—1. *On Heart.*—After a brief inhalation of this drug, the action of the heart becomes excessively rapid, the face flushes, and a violent throbbing in all the arteries is experienced; and if its administration is pushed up to poisonous limits, there is much weakening of the cardiac pulsations.

2. The effect on the arterial system is one of marked dilatation, the vessels enlarging, as proved not only by general flushing, but by congestion of the retina, and by the free flow of blood from cupped surfaces which had previously yielded only a few drops. The arterial tension becomes much lowered, and this enlargement of the calibre of the vessels has been proved to depend on a direct action of the drug on the muscular coats of the arteries, and not on any intervention of the vaso-motor system.

It has also been proved that oxidation is diminished, that the hæmoglobin of the blood is checked in its function of absorbing and giving up oxygen, and that, previous to death, the color of the arterial and venous blood becomes almost precisely alike.

its inhalation has apparently been followed by relief.

II.—1. The nitrite of amyl has been proposed as an antidote in chloroform poisoning, and as a remedy for the peculiar heats and flushes so common in women about the menopause. [When chloroform is administered as an anæsthetic, nitrite of amyl should be at hand for immediate use in case of syncope.]

2. In consequence of this dilating effect on the vessels, amyl has been most successfully used in angina pectoris. The essential condition here is supposed to be one of spasmodic contraction of the smaller pulmonary and systemic vessels, against which the heart, generally weakened, as it is in this disease, by mal-nutrition of its muscular structures, finds itself unable to cope, and hence the agonizing distress. Inhalation of the drug releases the spasm, and so gives ease; and this result follows whether there be actual valvular disease or not. This explanation of Brunton's, who had the merit of first using the drug in angina pectoris, has been disputed of late, Dr. George Johnson holding that the rise of arterial tension is not the primary cause of the agony, but is merely a secondary reflex result, and that the

III. *On Respiration and Temperature.*—During the early stage of amyl inhalation the respiration is hurried, but when the administration is further pushed the breathing becomes slower, and finally extinguished, from the arrest of the corpuscular action noted above, and from a paralyzing effect on the respiratory nervous centre. The temperature tends to fall, from the diminution in the process of oxidation.

IV. *On the Digestive System.*—The presence of sugar in the urine has been observed during amyl inhalation, this being probably due to dilatation of the hepatic vessels.

remedy acts solely by reason of its antineuralgic virtues, seeing that relief is obtained with as much certainty when the face flushing already exists.

Brunton's views, however, seem most in accordance with the facts observed; but whichever side be right, there can be no doubt about the accuracy of the evidence brought forward in favor of the clinical superiority of this over any other mode of treatment for this previously hopeless disease.

III. Amyl has been successfully used during the paroxysm of spasmodic asthma, acting, no doubt, by relaxing the muscular walls of the bronchial tubes, and it has also been confidently recommended as an efficient remedy for whooping-cough, an assertion which experience does not confirm.

IV. Amyl has been theoretically recommended in cholera; but there is no special evidence in its favor. It is said that sea-sickness has occasionally yielded to its use.

MODE OF ADMINISTRATION, CAUTIONS, &c.

Amyl is now known to act much more speedily and effectually when inhaled than when taken by the mouth, and from

2 to 5 drops placed on a handkerchief are cautiously drawn into the lungs until the characteristic flushing is produced. It may be very conveniently used in glass capsules, which the patient can carry readily about with him. Remember that it is very apt to deteriorate by keeping, and that the druggist's stock must frequently be renewed.

No special accidents are recorded as having arisen from its use; but the caution seems a reasonable one, not to recommend it rashly to old persons with brittle or calcareous arteries, as the sudden alteration of calibre might be attended with danger. Possibly also it might be advisable not to recommend it to very plethoric patients, whose brains are already overloaded with blood.

Anæmic and epileptic patients seem to be specially tolerant of its use.

[In this connection we may consider also the well-known explosive agent—Nitroglycerinum, Nitroglycerine—which is not, however, officinal. It is also sometimes known as Trinitroglycerin, Glonoin, and in combination with clay, it is used for blasting, under the designation of dynamite.]

Nitroglycerine is a poison exerting a marked effect on the nervous system, producing, according to Brunton and Tait, "accelerated respiration, paralysis, loss of reflex action and apparently, to a great degree, of sensation, and death from stoppage of the respiration." In frogs, after death, the brain is anæmic and heart empty, but the lungs are engorged with blood.

It has been recommended for epilepsy, headache and asthma; it has no smell, but its vapors cause intense headache, throbbing, and fulness, rapid pulse, perspiration and occasional nausea. Of late, it has been highly praised by Dr. Murrell for the relief of angina pectoris; and clinical experience has so amply confirmed his statements that it is now an established remedy, not only for the major seizure, but for all forms of breathlessness and spasmodic discomfort possessing the anginiform quality. *Tabellæ nitroglycerini* (P. Br.) are made of chocolate, and contain $\frac{1}{100}$ gr. Dose 1 or 2. Used in $\frac{1}{2}$-drop doses of a one per cent. [alcoholic] solution, every 3 hours, and cautiously increased, marked effects are produced, and decided relief afforded, its action being slower, but more permanent than amyl nitrite.

[The officinal nitrites (sodium and potassium), in doses of gr. j to v or more, have a decided lowering influence upon the circulation, respiration and temperature.]

AMYLUM—STARCH.

[*The fecula of the seed of Triticum vulgare, Villars* (*N. O. Graminaceæ*).

OFFICINAL PREPARATIONS.

Amylum Iodatum. (Iodine, 5 per cent.) Dose, ʒj–ij (4 to 8 Gm.).

Glyceritum Amyli. (Starch 10, glycerin 90.) For external use.

Starch is used medicinally as an antidote to iodine, and as a demulcent in corrosive poisoning. In the form of a dusting powder it is applied to the skin of infants to prevent chafing and excoriation. It also makes with boiling water a bland poultice.]

Starch is a demulcent, used with advantage to some irritable conditions of skin in the form of the glycerite of starch, and also as a medium for enemata.

ANISUM—ANISE.

[*The fruit of Pimpinella Anisum, Linné* (*N. O. Umbelliferæ Orthospermæ*).

OFFICINAL PREPARATIONS, U. S.

Aqua Anisi. (Ol. anisi, 2 parts per thousand.) As a vehicle.

Oleum Anisi. Dose, gtt. x (.06 to .65 Gm.).

Spiritus Anisi. (Ol. anisi 10, alcohol 90.) Dose, ʒj–ij (4–8 Gm.).

Anise is carminative and stomachic, and is a favorite flavoring ingredient in medicines for children. It enters into Tinctura Opii Camphorata and Trochisci Glycyrrhizæ et Opii.]

Anise, Fennel, Coriander, Caraway, and Dill are agreeable aromatics, stomachics and carminatives.

ANTHEMIS—CHAMOMILE.

[*The flower heads of Anthemis Nobilis, Linné (N. O. Compositæ), collected from cultivated plants.*

Infusum Anthemidis. Dose, f℥ij (64 Gm.) as a tonic; as an emetic *ad lib.*

An agreeable aromatic; in small doses it is drunk as a tonic, and in large doses the hot infusion is taken as an emetic. A poultice is sometimes made of the boiled flowers.]

Chamomile has usually been considered a substance of no special therapeutic interest, being principally used by country people in the form of infusion as a remedy for *dyspepsia;* but within more recent years various German authorities, quoted by Phillips, have stated that the oil has a powerful lowering action on the reflex irritability of the spinal cord, and have proposed its use in cases of strychnine-poisoning. [It may be administered in doses of ♏ij-x (.13 to 62 Gm.].

ANTIMONIUM—ANTIMONY.

[OFFICINAL PREPARATIONS, U. S.

Antimonii et Potassii Tartras. Dose, gr. $\frac{1}{12}$ to j (.005 to .06 Gm.).

Antimonii Sulphidum—(the purified tersulphide, used in making the oxide).

Antimonii Oxidum. Dose, gr. ij–iij (.12 to .20 Gm.).

Antimonii Sulphidum Purificatum. Dose, gr. $\frac{1}{4}$–1 (.01 to .06 Gm.). Used in making Antimonium Sulphuratum.

Antimonium Sulphuratum (sulphurated antimony). Dose, gr. j–iij (.06 to .20 Gm.). As an emetic, gr. v.–xx (.32 to 1.30 Gm.).

Pulvis Antimonialis (James's powder). (Antimonii oxidum 33, calcii phosphas 67.) Dose gr. iij–v (.20 to .30 Gm.).

Pilulæ Antimonii Compositæ. (Each contains $\frac{1}{2}$ gr. of calomel and sulphurated antimony and 1 gr. of guaiac.) Plummer's Pills. Dose, 1 or 2.

Vinum Antimonii (Tartar emetic, about gr. ij to f℥j). Dose, gtt. x (.60 Gm.); as an emetic, fʒj (4 Gm.). (Enters into Mistura Glycyrrhizæ Compositæ, 6 parts per 100.)

Syrupus Scillæ Compositus (contains Tartar emetic, nearly gr. j in ℥j, or 3 parts in 2000).

Metallic antimony is not regarded as a poison; but its vapor is said to cause unpleasant symptoms when respired.

Antimony, Tartarized, generally known as Tartar Emetic, is an irritant metallic poison.

SYMPTOMS OF POISONING.

Nausea and severe vomiting, hiccough, cardialgia, burning heat at the epigastrium, severe colic and purging, small and rapid pulse, cold skin, syncope, difficult respiration, vertigo, insensibility to external stimulants, painful cramps in the lower extremities, and great prostration of strength.

MORBID APPEARANCES.

The stomach and intestines often much inflated with gas; their mucous membrane red, and covered with a slightly adhering viscid layer; the peritoneum of a dark brick-red hue; the membrane of the brain displaying marks of inflammation.] Death may occur from the collapse following prolonged vomiting and purging, or may be the result of gastro-intestinal inflammation. Post-mortem examination of a protracted case generally discovers parenchymatous degeneration of the liver and other internal organs.

[TESTS.

In a solid state, add charcoal, introduce into a test-tube and expose to heat; metallic antimony will be deposited, of a grayish-black lustre. In solution, diluted nitric acid causes a white precipitate. Sulphuretted hydrogen throws down a reddish-orange precipitate. Tannin causes copious, curdled, whitish-yellow precipitate. Should matters from the stomach be present, the solution must be well agitated with a small portion of muriatic and tartaric acid, and filtered previous to being experimented upon.

TREATMENT.

Encourage vomiting by free administration of warm water and other diluents, or employ the stomach-pump, if necessary. Infusions, tinctures, or extracts, containing tannin, are very useful by decomposing the poison. Give tea, coffee, and stimulants. Tannic acid converts the salt into an insoluble tannate.]

LOCAL ACTION.

Physiological.	*Therapeutical.*
Externally applied, tartar emetic causes redness and inflammation of the skin, followed by an eruption of papules becoming vesicular, and finally forming pustules closely resembling those of small-pox.	Tartar emetic used to be extensively employed in the form of ointment as a counter-irritant, but was found occasionally to cause inflammation, and to leave unsightly scars.

INTERNAL ACTION AND USES.

I. *Brain and Nervous System.*—Tartar emetic under certain conditions, and more especially when combined with opium, exerts a sedative influence on the brain. When given in poisonous doses, paralysis, probably of spinal origin, and attended with diminished reflex irritability, sets in.	I. Its use was originally recommended by Graves, and has been indorsed by Murchison, in the violent delirium of *typhus*, and it has also been employed with benefit in *delirium tremens.*
II. *Circulation and Respiration.*—Antimony is sedative in its operation on the heart and vascular systems, the heart's action becoming slow, weak, and finally irregular, the arterial tension lowered, and the pulse soft and compressible. The respiration also grows slower, and an increased secretion takes	II. The depressing influence of tartar emetic on the circulation caused it to be very generally used in former years in acute inflammations, and more especially *pneumonia;* but this practice has now been almost generally abandoned, as it was found that such treatment, whilst exerting no real influence

place from the bronchial mucous membrane.

General muscular relaxation is observed.

III. *On Secreting Organs.* 1. *Stomach and Intestines.*—Antimony is an effectual emetic, its action being slow, however, and attended by a good deal of depression. It acts either when swallowed, or by subcutaneous injection; but the balance of experiment goes to show that in either case the effect is produced by reflex action following irritation of the nerves of the stomach. Some increase of secretion from the intestines and consequent diarrhœa are occasionally observed.

over the course of the disease, tended to reduce the strength of the patient, and cause lingering convalescence. Small doses, however, are found useful in *croup* [when not diphtheritic], and in the *bronchopneumonia* of children where great dyspnœa and fever exist with excessive bronchial secretion; and it is a good general expectorant in *asthma*, [the first stage of] *bronchitis*, etc.

Its relaxing effects on the muscular system were formerly taken advantage of for the reduction of *herniæ* and *dislocations*; but it has of course been quite superseded by chloroform and other anæsthetics.

1. Antimony is too slow and depressing an emetic to be used in cases of poisoning, but it is of service in *croup*, *whooping-cough*, *bronchitis*, etc., where we wish to relax the bronchi and get rid of accumulated secretions.

In former years, when antimony was freely given, what was called tolerance used to be an interesting therapeutic result. That is to say, in feverish conditions, it was found that large quantities of the drug might be taken without producing vomiting; and this has been explained by the observation that antimony, to act as an emetic, must previously be dissolved in the gastric juice, a secretion which is in great measure checked during fever. Gubler explains the tolerance more simply, by suggestion that the system is too weak to carry out the energetic series of actions causing vomiting.

2. *Skin.*—Antimony has a powerful diaphoretic action.

2. Antimonial wine is a common adjunct to diaphoretic mixtures. It has been used in small doses with good result in *psoriasis* from its chemical relationship with arsenic. On account of its chemical affinities with arsenic and phosphorus, it has been prescribed in scaly skin affections, and although my own experience hardly bears out the success recorded by others, several good authorities, like Malcolm Morris and Spender, have faith in its use in doses of ♏xv–xx every three hours.

MODE OF ELIMINATION, ETC.

Tartar emetic rapidly enters the blood, and is eliminated by the bile, milk, sweat, and urine, as well as the gastro-intestinal glands.

FORM OF ADMINISTRATION.

Tartar emetic, on account of its tastelessness, may be well given dissolved in simple distilled water; and Ringer tells us, and I have amply confirmed his statements, that we may do much good, in some forms of acute bronchitis in children, by dissolving a grain of the salt in a pint of water, and giving a teaspoonful every quarter of an hour for the first hour, and then hourly.

In the case of adults, when we wish to avoid the nauseating effects of the drug, we may best do so by the following formulæ:—

℞.	Antimonii et potassii tart.	gr. ij;	or		12	Gm.
	Acidi hydrocyanici diluti	♏xxx;	"	2		"
	Tincturæ lavandulæ comp.	f℥ss;	"	16		"
	Aquæ destillatæ q. s. ad	f℥vj;	"	192		" M.

Dose, f℥ss quartis horis.[1]

℞.	Liq. opii sed.[2]	fʒj;	or	4		Gm.
	Antimonii et potassii tart.	gr. j–ij;	"		06	"
	Aquæ camphoræ	f℥vj;	"	192		" M.

S. Sumat semiunciam omni horâ donec somnus supervenerit.

Highly recommended by Graves and Murchison in the insomnia and delirium of *typhus fever*.

[Tartar emetic in broken doses is very useful in acute pneumonia, from its action on the skin as well as on the respiratory centre.

℞.	Antimonii et potassii tart.	gr. ½;	or		03	Gm.
	Pulv. digitalis	gr. x;	"		60	"
	Pulv. ipecac. comp.	gr. xl;	"	2	60	" M.

Ft. chart. no. xx.

S. Capiat unam secundâ quâque horâ.

In *pneumonia.*]

[APOCYNUM—APOCYNUM.

(CANADIAN HEMP.)

The root of Apocynum Cannabinum (N. O. Apocynaceæ).

Dose, in substance, gr. v–xxx (.35 to 2. Gm.).

Emetic and cathartic in large doses, especially in the form of decoction. In smaller doses acts as an expectorant, diaphoretic, and diuretic. In chronic nephritis (Bright's disease) it may be administered to relieve dropsy.]

[APOMORPHINÆ HYDROCHLORAS—HYDROCHLORATE OF APOMORPHINE

($C_{17}H_{17}NO_2HCl$—303.4).

The hydrochlorate of an artificial alkaloid prepared from morphine.

(See under OPIUM.)

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[1] [Each dose contains two and one-half minims of dilute hydrocyanic acid. This being the case, the first dose should not exceed fʒj; to be cautiously increased.]

[2] [Battley's solution, non-officinal. It is about twice the strength of laudanum.]

AQUA—WATER.

[*Natural water in its purest attainable state.*

Aqua Destillata. Distilled water.]

Water, both in its external and internal applications, enters so largely into medical practice as well as into domestic economy, that we cannot begin our studies better than by considering very briefly what is definitely known regarding its physiological and therapeutical properties.

[Water in a natural condition is more or less impregnated with saline or organic matters, and always contains in solution more or less solid, liquid, or gaseous impurities. Pure water boils at 100° (212° F.) at the level of the sea; if it contain much foreign matter, its boiling point may be raised. *Mineral* waters are those which permanently contain an unusual quantity of saline substance in solution. *Hard* water contains carbonate or sulphate of lime and magnesia; the former, being remediable by boiling, is called *removable hardness*, while the latter is *permanently hard*. Hard water will not make a lather with the ordinary alkaline soap, but simply curdles, because the lime combines with the fatty acids and is precipitated. This is the basis of division of water into *hard* and *soft;* spring and well water are often hard; rain and river water are usually soft.

The following classification of water is furnished by the Rivers Pollution Commissioners in their sixth report, etc.:—

I. In respect of wholesomeness, palatability, and general fitness for drinking and cooking:—

Wholesome	1. Spring water 2. Deep well water	Very palatable.
	3. Upland surface water	Moderately palatable.
Suspicious	1. Stored rain water	
	2. Surface water from cultivated land	Palatable.
Dangerous	1. River water to which sewage gains access 2. Shallow well water	

II. According to softness—

1. Rain water.
2. Upland surface water.
3. Surface water from cultivated land.

4. Polluted river water.
5. Spring water.
6. Deep well water.
7. Shallow well water.

III. In respect of the influence of geological formation in rendering water sparkling, colorless, palatable and wholesome by percolation, the following water-bearing strata are given as most efficient:—

1. Chalk.
2. Oolite.
3. Green sand.
4. Hastings sand.
5. New red and conglomerate sandstone.][1]

BATHS AND EXTERNAL APPLICATIONS.

It will be found difficult, if not impossible, to balance the physiological and therapeutical actions of water in the manner followed generally throughout this work, and we shall therefore give a short collective sketch of the influence exerted by it on the various functions of the body.

It is not necessary for us to do more than refer to the universal use of water for washing and bathing purposes, but a word or two on the physiological effects of cold baths is required. We find that the action of the heart is increased, the respiration may become panting and irregular, the temperature falls, and the destructive metamorphosis of muscular tissue is augmented, as indicated by an increased excretion of urea; occasionally albumen appears in the urine, and so much mental shock is produced, more especially by sea-bathing, as to render this usually excellent tonic inadvisable in those of feeble or hysterical constitutions, in the very young and old, and in pregnant or menstruating women, whilst the tendency to vascular strain must prescribe caution towards those in whom we have any reason to suspect aneurism or a degenerated state of the arterial system.

Occasionally, during sea-bathing, the hair falls off, the process of digestion becomes impaired and sleeplessness is experienced; and this, no doubt, arises from the process of tissue destruction not being thoroughly balanced by repair.

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[1] [Given by Wilson in his "Handbook of Hygiene," Am. ed., Philada., 1877, pp. 141–142.]

As regards the external uses of cold water in medical practice, we may refer to the beneficial action of water-dressing and irrigation in surgery, to cold affusion in *laryngismus stridulus*, *cholera*, *hysteria*, the stupor of fevers and drunkenness, and, most of all, to the wonderful refrigerant action of cold baths in cases of abnormally high temperatures.

It is generally held that a fatal result almost inevitably occurs in any case where the bodily temperature remains above 107° for several days at a time, and until very recently we were powerless to check the destructive influence of this complication. Within the last few years, however, Dr. Wilson Fox and others have shown that we may safely and effectually bring down this excessive heat in *rheumatism*, where it principally occurs, by placing the patient in a bath at 95° and gradually adding cold water or ice until 60° Fahr. is reached. In this way a reduction of from seven to twelve degrees may be readily effected, but we must remember one practical point, that the patient's temperature continues to fall, as much even as six degrees, for forty or fifty minutes after he has been removed to bed. Four or five baths may be required during the first day of treatment, the patient remaining immersed during twenty or thirty minutes. There can be no doubt that by watching our cases of rheumatism carefully, and adopting this mode of treatment whenever the thermometer registers more than 105° Fahr., we may save many lives. We may remember that the lowering effect is in inverse proportion to the weight of the body, and that the best effects are produced at the time when the temperature has a tendency to sink spontaneously, as from 7 in the evening till morning, and again from 11 to 2 in mid-day. Beware of collapse, which is no is no imaginary danger, and must be met by stimulants.

The Germans use the cold bath very freely in all febrile disorders, Liebermeister keeping his bad cases immersed for even two hours, and their success in diminishing the death-rate seems to be considerable. Much variety of opinion exists on the subject in this country, and a discussion at the Medical Society of London on cold bathing in enteric fever may be read with profit (*vide* "Transactions," vol. vii.), and from it we may come to the conclusion that no very marked influence on mortality has been produced by systematic cold bathing, but that metabolism may be diminished, and some of the more characteristic symptoms of the typhoid state lessened in severity. Broadent's rule seems a good one—to use cold sponging when the temperature reaches 102°, and not begin the bath until the thermometer records 104°.

Cold packing is an excellent stimulant to the skin; it is useful as a less effectual but more agreeable mode of using antipyretic treatment, and is of service in acute eruptive disorders, when the rash recedes.

Warm water is also very serviceable, and we may mention the soothing action of warm fomentation, the warm *douche* in early joint disease, and the use of the warm bath in the convulsive diseases of children, for the relief of colic spasmodic stricture, hernia, gall or renal calculi, and in cases of extensive burns or moist skin diseases, employed after the manner of Hebra, whose patients frequently remain in a state of continuous soaking for days together.

Ice is a most valuable application for relieving pain and checking inflammation in *orchitis*, *bubo*, *meningitis*, etc., as well as for the arrest of hemorrhage, and to allay thirst and obstinate vomiting; and introduced into the rectum it produces some antipyretic effect.

Vapor is often used as a soothing and relaxing application in *tonsillitis*, *bronchitis*, *croup*, etc.; and, in the form of bath, it favors diaphoresis.

Constitutional Action.

When water is taken internally, it acts in some measure as a purgative by supplying moisture to the feces; it promotes digestion by stimulating the secretion of gastric juice and aiding the passage of peptones into the blood (Ringer); and it is in some measure a diuretic, increasing temporarily the excretion of chloride of sodium, and more permanently the elimination of urea, phosphoric and sulphuric acids by the urine. It is, of course, the universal solvent, and its importance in the animal economy is shown by the fact that it constitutes about sixty-eight of the hundred parts which build up our entire bodily frame, and that five pints are given out from the body of one average-sized adult in the twenty-four hours. The urgent necessity for its purity is further proved by the leading part it has always taken in the spread of epidemics; for not only cholera, but also enteric fever, has thus been largely propagated, whilst entozoa are thus introduced into the system, and the presence of other impurities may give rise to dysentery, diarrhœa, goitre and yellow fever. [The most dangerous adulteration of drinking water is that occasioned by the presence of decaying organic or albuminoid matter. During epidemics of bowel affections, all water should be boiled previous to drinking.] Specific adulterations also, like lead, have frequently occasioned very painful and even fatal attacks of illness.

But we derive great benefit in practice from the use of some of those very impure waters, highly impregnated with various mineral ingredients, which are known as mineral waters, and which are met with in such profusion and variety both at home and abroad. Fashion, no less than undoubted success attending their use, has now brought these naturally adulterated waters prominently forward, and it is very essential that every practitioner should have some knowledge of their chief constituents and the principal health resorts where they can be partaken of in greatest perfection. Our present limits, however, will only permit a very bare enumeration of the principal classes into which mineral waters have been divided.

1st. We have the chalybeate or ferruginous class, which contains iron in varying proportion, in the form either of carbonate held in solution by carbonate acid gas, as at [Excelsior Rock Spring, Saratoga] Spa, Tunbridge Wells, and Harrowgate; or of sulphate, as at [Bedford Springs, Pa., Fairmount Park, Phila.] Brighton, Isle of Wight, etc. Some are hot and some cold, and some, as Monte Doré, contain a minute quantity of arsenious acid. Whilst we generally find them well borne as carbonate, we must be cautious of their use in very plethoric and full-blooded patients. They are very useful in cases of anæmia, chlorosis, struma, and other conditions of debility.

2d. Acidulous or carbonated. These are agreeable and sparkling, holding in solution carbonates of lime, soda, and magnesia. They are met with at [Gettysburg] Seltzer, and Carlsbad, and are serviceable in gout and dyspepsia.

3d. Saline, some of which are purgative by containing the sulphates of magnesia and soda, as at [Saratoga, Empire Spring] Cheltenham, Leamington, Friedrichshall, etc.; others, as Buxton, Bath, and Bristol, are impregnated with carbonate and sulphate of lime; others with chlorides, as Wiesbaden, Baden-Baden; a fourth class contain iodine and bromine in combination with sodium and magnesium, as at Homburg, Kissingen, Woodhall, etc.; whilst a fifth class, as at Vichy, Ems, Apollinaris and Hunyadi Janos, owe their properties to the alkaline carbonates which they contain.

4th. Sulphuretted or hepatic waters contain sulphuretted hydrogen in solution, and possess a very offensive taste and smell. They are generally thermal, frequently having a high temperature. They are chiefly met with at Harrowgate, Moffat, Cheltenhham, Aix-la-Chapelle [Virginia Sulphur Springs], Baréges, Eaux Bonnes, etc., and are principally used in chronic skin diseases, in chronic rheumatism and bronchitis, in advanced syphilis, and for the elimination of mercury from the system. Those patients who are unable to visit the different spas at home or abroad may drink the bottled waters, or we may manufacture rough imitations by combination of the various ingredients. In prescribing saline purgatives, we should always remember the principle of very free dilution and frequently repeated small dose on an empty stomach; but, although we may often do great good by this mode of administration, we miss the change of air and scene, the early and regular hours, the simple diet, and the especial faith and mental anticipation with which the chronic rheumatic and dyspeptic approach the health resort of their choice.

[Aquæ.

The class of Medicated Waters in the U. S. Pharmacopœia includes the following:—

Aqua Ammoniæ
" Ammoniæ Fortior
" Amygdalæ Amaræ
" Anisi
" Aurantii Florum
" Camphoræ
" Chlori
Aqua Cinnamomi
" Creasoti
" Destillata
" Fœniculi
" Menthæ Piperitæ
" Menthæ Viridis
" Rosæ.]

[AQUA CHLORI—CHLORINE WATER.

An aqueous solution of Chlorine (Cl : 35.4), containing at least 0.4 *per cent. of the gas.*

Dose, largely diluted, f℥j–iv (4. to 16. Gm.).

A greenish-yellow clear liquid having the suffocating odor and disagreeable taste of Chlorine. Used externally as a disinfectant. Watson recommended an extemporaneous chlorine solution to be used in diphtheria.]

The use of chlorine is almost entirely confined to its external application.

Physiological Action.	*Therapeutical Action.*
1. Concentrated chlorine gas directed upon the skin causes redness and smarting, followed by a pustular eruption and even erysipelatous inflammation.	1. It is never, however, used as a counter-irritant.
2. It is an excellent disinfectant, decomposing sulphuretted hydrogen and ammonium sulphide at once and more effectually than any other gas, and also destroys organic matter in the air, as it bleaches organic pigments and destroys odors, either by abstracting hydrogen or by oxidation.	2. It is therefore extensively used as given off by chloride of lime to purify the air from offensive effluvia, and to destroy infectious germs. In the form of lotion it is also used to cleanse foul or sloughing sores.
3. The inhalation of chlorine gas is stimulating or irritating to the lungs.	3. It has therefore been used in some forms of chronic bronchitis and phthisis, but is not now much employed. [It may be used in ***strychnine-poisoning.***]

Internal Use.

Chlorine used to be given internally in medicine in various infectious fevers with a view to disinfection, but this has now become quite obsolete. [As extemporaneously made by the action of muriatic acid ℥j, upon chlorate of potassium gr. x, to which a pint of water is added in successive portions, it is recommended by Watson and Flint for diphtheria and other zymotic diseases.]

Dose and Mode of Administration.

As a disinfectant chlorine is obtained by acting on chloride of lime with water or dilute sulphuric acid, or by pouring four parts by weight of strong hydrochloric acid on one part of powdered binoxide of manganese, or mixing four parts of common salt and one of binoxide of manganese with two parts by weight of sulphuric acid and two of water, varying the quantities according to the size of the room.

Vapor chlori [Br.] is used for inhalation, and liquor chlori [Br.] aqua chlori [U. S.] may be employed diluted as a lotion, or given internally.

DISADVANTAGE.

The great drawback of chlorine is the very irritating nature of its vapor, rendering it unsuitable for general use in rooms actually inhabited by the sick.

ARGENTUM—SILVER.

[OFFICINAL SALTS, U. S.

Argenti Cyanidum—for making Acidum Hydrocyanicum Dilutum for immediate use. Dose, gr. $\frac{1}{40}$–$\frac{1}{20}$ (.0016–.003 Gm.).

Argenti Nitras. Dose, gr. $\frac{1}{6}$–$\frac{1}{2}$ (.01 to .03 Gm.).

Argenti Nitras Dilutus (Mitigated lunar caustic, equal parts of nitrates of silver and potassium) for external use.

Argenti Nitras Fusus—Lunar caustic, for external use.

Argenti Oxidum. Dose, gr. ss–ij (.03 to .12 Gm.), in pill.

Argenti Iodidum. Dose, gr. $\frac{1}{8}$–j (.008–.065 Gm.).

ANTIDOTE.

The chemical antidote to nitrate of silver is table salt, which should be followed by an emetic or a purgative.

Metallic silver is inert. As it occasions no chemical irritation in the tissues, canulæ are made of it for use in *empyema* to wash out the chest, etc., and silver wire is also used in surgery to unite the fractured ends of bones where there is delayed union, and for sutures in wounds of the scalp and elsewhere. The salts of silver are best administered in pill form, for which gum Arabic is probably the best excipient, as with vegetable extracts, or glucose, they are apt to explode.]

LOCAL ACTION.

Physiological.	*Therapeutical.*
The nitrate of silver primarily hardens, but secondarily destroys, the cuticle, and condenses the tissues by coagulating their albumen.	Nitrate of silver, either in substance or solution, has been used to check the spread of erysipelatous inflammation; to arrest the pitting of *smallpox;* and to avert the formation of bed-sores.
Its application may cause ulceration of the healthy skin, and it is often used to check the activity of granulating surfaces. A convenient form is the argenti nitras dilutus used as pencils.	It is a good injection for *gonorrhœa*, or collyrium for *conjunctivitis*, and a strong solution is one of our best remedies for various relaxed or ulcerated conditions of the fauces. In substance, lunar caustic forms a good application to simple venereal sores, ulcerated tonsils, or to any ulcerating or granulating tissue, when we wish to repress exuberant granulations or excite a new and more healthy action.

INTERNAL ACTIONS AND USES.

Silver is now but little employed internally. It formerly enjoyed a great reputation in the treatment of nervous disorders; and Erb and Seguin hold it to be of great value in the earlier stages of locomotor ataxy. I am, however, quite convinced, from my own observation, that it is sometimes useful in epilepsy, more especially as replacing bromide of potassium, when that valuable remedy has temporarily lost its power over the disease.

And, again, it seems to be the only curative agent in some peculiarly severe cases of gastralgia, patients occasionally willingly running the risk of disfigurement in the hope of cure. In prescribing it, we must never forget its power of causing an indelible and most unsightly greyish-blue discoloration of the skin, seldom appearing, however, before the salt has been used for three months.

[Pepper has used the nitrate of silver in the treatment of *typhoid fever* with excellent results in controlling diarrhœa, relieving irritation, and possibly preventing hemorrhage. The remedy (gr. $\frac{1}{4}$ to $\frac{1}{6}$) is given in mucilage of acacia, three or four times daily; and if the bowels are constipated extract of belladonna is combined with it; if there is much looseness a few drops of deodorized tincture of opium are added.][1]

ARNICÆ FLORES—ARNICA FLOWERS.

[*The flower heads of Arnica Montana, Linné (N. O. Compositæ).*]

ARNICÆ RADIX—ARNICA ROOT.

[*The rhizome and rootlets of Arnica Montana.*

OFFICINAL PREPARATIONS, U. S.

From the flowers.

Tinctura Arnicæ Florum. (20 per cent.) Dose, gtt. x–xxx (.65 to 2 Gm.), well diluted.

From the root.

Extractum Arnicæ Radicis. Dose, gr. j–iij (.06 to .20 Gm.).

Extractum Arnicæ Radicis Fluidum. Dose, ♏ v to xx (.32–1.30 Gm.).

Tinctura Arnicæ Radicis. (10 per cent.) Dose, ♏ v–x (.32–65 Gm.).

Emplastrum Arnicæ (Ext. arnicæ radicis and emplast. plumbi, 2 parts).]

EXTERNAL ACTIONS.

If applied to the skin for some time, arnica causes redness and irritation, and in some susceptible subjects most violent erysipelatous inflammation, even ending in death, has resulted. It must therefore be used with caution.

Some practitioners value arnica highly for the power which they believe it to possess of absorbing bruises and relieving sprains. Dr. Garrod, on the other hand, asserts that any power it seems to exercise in dispersing extravasations of blood is simply due to the spirit which the tincture contains. Dr. Phillips, again, tells us that the irritating effects never follow the use of an aqueous solution, which contains none of the arnicine or volatile oil.

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[1] [Proceedings of the Philadelphia County Medical Society, vol. iii. p. 51.]

Physiological.

[Roberts Bartholow sums up its action as follows: Increases flow of saliva; causes nausea and vomiting; even irritant poisoning may result; it increases secretion from mucous membranes. It rapidly diffuses into the blood, and in small doses acts as a stimulant, increasing the action of the heart, producing a general feeling of warmth throughout the body; it increases the secretion of the kidneys and the sweat glands. In larger doses the stimulating effect is shorter in duration, and is followed by vomiting, depression, or collapse. Death is caused by arrest of action of the heart.]

Therapeutical.

[Arnica has not been used much internally, but recent investigations show that it may well be employed as a cardiac stimulant in low grades of fever, in small doses, frequently repeated. In order to depress the temperature and action of the heart larger doses will be required. In *delirium tremens*, where restlessness is due to debility, small doses may be used; in mania, with high arterial excitement, large doses will be called for. It has also been recommended in a similar mode of employment in *acute rheumatism* and rheumatoid arthritis.]

POISONING.

[Poisonous doses cause dilated pupils, pain in the head, and stupor due to accumulation of carbonic acid in the blood. Atropine is the physiological antidote.]

INTERNAL ACTIONS.

The physiological and medicinal actions of arnica can only be balanced with difficulty, as the evidence regarding the former is very conflicting, and the opinions on the latter certainly err in the direction of over-confidence. As it is rarely, if ever, used as a medicinal agent save by homœopathic practitioners, it does not seem necessary to say more about its asserted virtues.

ASAFŒTIDA—ASAFETIDA.

[*A gum-resin, obtained from the root of Ferula Narthex, and Ferula Scorodosma (N. O. Umbelliferæ).*

Officinal Preparations, U. S.

Mistura Asafœtidæ (4 per cent.). Milk of Asafetida. Dose, f℥ss–j (16 to 32 Gm.).

Mistura Magnesiæ et Asafœtidæ (Dewees's Carminative). (Tr. Opii deod. 1 per cent.) Dose, ʒss–j (2. to 4. Gm.).

Tinctura Asafœtidæ (20 per cent.). Dose, fʒss–j (2 to 4 Gm.).

Pilulæ Asafœtidæ (each gr. iij). Dose, 2 to 4.

Pilulæ Aloes et Asafœtidæ (each gr. j⅓).

Pilulæ Galbani Compositæ (asafetida gr. ½).

Emplastrum Asafœtidæ (35 per cent. asafetida).]

Physiological Action.

A good deal of digestive disturbance seems to follow the administration of this drug to healthy persons; but the evidence is too conflicting to enable us to lay down any exact scheme of its influence on the various functions of the body.

Therapeutical.

Asafœtida has been used and recommended in a considerable variety of affections, but practically it is now only prescribed in flatulent dyspepsia and in hysteria, where its excessively nauseous smell and taste are supposed to give it an advantage over other drugs of the same class.

Horatio C. Wood states that "asafetida is one of the most efficient of the so-called antispasmodics, and may be given to fulfil the same indications as valerian in *functional spasm*, in *hysteria*, and *nervousness*. It differs from valerian in having a much more decided action upon the mucous membranes. It is an excellent carminative, and in the form of injection is constantly used for the relief of *tympanites*. It also in small doses increases the appetite and affords relief in *dyspepsia*, with *flatulent colic* and *costiveness*, of the aged or hysterical. As a stimulating expectorant and antispasmodic, it is useful in *whooping-cough* and *chronic catarrh*. It is especially efficient in palliating the latter affection as occurring in old people, when the difficulty of breathing is paroxysmally increased by spasm of the bronchial tubes. In *infantile convulsions* and in severe infantile *colic*, asafetida enemata (ʒij to ℥ij of the milk) are exceedingly useful and harmless."—*Therapeutics*.]

[ASCLEPIAS—ASCLEPIAS (PLEURISY-ROOT).

The root of Asclepias tuberosa, Linné (N. O. Asclepiadaceæ).

Contains resinous and fatty matter. In small doses increases action of skin and kidneys, in large doses is emetic and purgative. It has some reputation for expectorant qualities, and it depresses the heart's action. Dose a half drachm to a drachm in infusion.]

ASPIDIUM—ASPIDIUM (MALE FERN U. S. 1870).

[*The rhizome of Aspidium Filix Mas, Swartz, and of Aspidium marginale, Willdenow (N. O. Filices).*

OFFICINAL PREPARATION.

Oleoresina Aspidii. Dose, ♏xxx-ʒj (2. to 4. Gm.].

LOCAL ACTION.

Fern oil has no local action.

CONSTITUTIONAL ACTION.

Physiological Action.

The only marked action of the male fern is that of killing tape-worms. It occasionally produces a little nausea and diarrhœa, but in most cases it can be taken without discomfort. [Its virtue resides in an oleoresin, which is the officinal title in the U. S. P., but which is termed a fluid extract in the Ph. Br.; it is also sometimes spoken of simply as oil of male fern.]

Therapeutical.

Fern-oil is used in medicine purely as an anthelmintic. Its destructive influence over all varieties of *tæniæ* has been effectually proved by a great mass of evidence, and one or two doses generally succeed in dislodging the entire worm. It is essential that the draught should be taken on an empty stomach, and, the intestines having been first cleared by a purgative, we direct our patient to fast for a few hours before bedtime, when he is advised to take a drachm of the liquid extract [oleoresin] suspended in milk. Or we may avail ourselves of the following formula, which acts well in concealing the nauseous flavor of the drug:—

℞. Oleoresinæ filicis	fʒiss;	or	6	Gm.
Mucilaginis tragacanthæ	f℥ss;	"	16	"
Syrupi zingiberis	fʒij;	"	8	"
Aquæ q. s. ad	f℥iss;	"	48	"

Misce, fiat haustus nocte vel primo mane sumendus.

ATROPINA—ATROPINE.

ATROPINÆ SULPHAS—SULPHATE OF ATROPINE.

(See BELLADONNA.)

AURANTII AMARI CORTEX—BITTER ORANGE PEEL.

[*The rind of the fruit of Citrus vulgaris. Risso (N. O. Aurantiaceæ).*]

AURANTII DULCIS CORTEX—SWEET ORANGE PEEL.

[*The rind of the fruit of Citrus aurantium* (*N. O. Aurantiaceæ*).]

AURANTII FLORES—ORANGE FLOWERS.

[*The partly expanded fresh flowers of Citrus aurantium and Citrus vulgaris* (*N. O. Aurantiaceæ*).

OFFICINAL PREPARATIONS, U. S.

Extractum Aurantii Amari Fluidum (for flavoring).

Tinctura Aurantii Amari (20 per cent.). Used for flavoring.

Aqua Aurantii Florum. Used as a vehicle.

Syrupus Aurantii Florum. Used as a vehicle.

Oleum Aurantii Florum. (Enters into Spiritus Odoratus.)

Elixir Aurantii. Simple elixir. Used as a vehicle.

Oleum Aurantii Corticis.

Syrupus Aurantii. Used as a vehicle.

Tinctura Aurantii Dulcis (20 per cent.). Dose, f℥j–ij (4. to 8. Gm.).

Spiritus Aurantii. (Oil of orange peel 6, alcohol 94 pts.)]

PROPERTIES.

The various preparations of orange require no detailed comment, for beyond the fact that those made from the rind are mildly tonic in virtue of their bitterness, and that the syrup and the orange-flower water are agreeable flavoring additions to a prescription, we have no evidence of their special therapeutic properties, if any exist. [The volatile oil of the flowers, obtained by distillation, is called, in commerce, oil of Neroli, and orange-flower water is hence sometimes termed Neroli water. Orange peel enters into the popular compound tincture of cinchona (Huxham's tincture) and the compound tincture of gentian.]

[AURI ET SODII CHLORIDUM—CHLORIDE OF GOLD AND SODIUM.

A mixture of equal parts of dry chloride of gold and chloride of sodium (corresponding with 32.4 per cent. of metallic gold).

Dose, gr. $\frac{1}{60}$ to $\frac{1}{30}$ (.001 to .002 Gm.).

LOCAL EFFECTS.

In concentrated form the chloride of gold is escharotic.

CONSTITUTIONAL EFFECTS.

The effects of the chloride of gold resemble those of the corrosive chloride of mercury ; in overdoses corrosive poisoning is produced ; the symptoms, closely assimilating those of the mercurial, call for the same remedial measures.

Physiological Effects.	*Therapeutical.*
Digestive Tract.—In overdoses gastro-enteritis is set up ; in minute continued doses, the gold salts act as stimulants to the glandular structures of the stomach and liver.	In dyspepsia, gold is useful in the same class of cases as are benefited by the nitrate of silver. In the early stages of cirrhosis of the liver the chloride of gold and sodium is one of the most efficient remedies we possess. (Bartholow.)
Circulation. — Like mercury, the chloride of gold reduces the oxidizing power of the red blood cells, and increases tissue waste. In small doses it stimulates the functions of nutrition, and increases assimilation.	In fibroid disease of other organs, such as the kidney, it is useful, especially in that form of Bright's disease characterized by a large amount of pale urine, containing but a small amount of albumen.
Nervous System.—In small doses the mental functions are quickened (Bartholow), but upon the spinal cord especially are its effects seen to be those of a decided stimulant.	In premature senility or decay of the mental powers, gold may be cautiously used with benefit; also in the different forms of sclerosis of the spinal cord in its early stages.

Sexual System.—The genital organs are stimulated through an action upon the spinal cord.

In the treatment of *defective menstruation*, and similar disorders dependent upon want of sufficient innervation, the gold salts have gained some reputation.

In tertiary syphilis the chloride of gold and sodium has been found to be an efficient substitute for mercuric chloride.]

[AZEDARACH—AZEDARACH.

(*The bark of the root of Melia Azedarach, Linné (N. O. Meliaceæ)*).

Following the administration of very large doses of the decoction, vertigo, dilated pupils, stertorous respiration and stupor sometimes occur. It generally causes vomiting and purging, and is an effective agent for destroying intestinal worms (lumbricoids, etc.). A fluid extract and a syrup have been used, but a decoction of the fresh bark (4 ozs. to a quart boiled down to a pint) is preferred, given in tablespoonful doses every two or three hours, to a child, until it purges.]

BALSAMUM PERUVIANUM—BALSAM OF PERU.

[*A balsam obtained from Myroxylon Peruiferum (N. O. Leguminosæ, Papilionaceæ)*).

Dose, f℥ss (2 Gm.) in emulsion.]

LOCAL ACTION.

Peruvian balsam tends to check copious and unhealthy secretions. [It has decided antiseptic properties.]

It may therefore be used, like myrrh, as an application to foul and unhealthy sores.

CONSTITUTIONAL ACTION.

Like the other gum balsams, it acts on the mucous membranes, and more especially on the bronchial tubes.

It has therefore been prescribed to restrain excessive discharges in *bronchitis*, etc. [It may be employed by inhalation with steam, or from an atomizer, in phthisis with benefit.]

BALSAMUM TOLUTANUM—BALSAM OF TOLU.

[*A balsam obtained from Myroxylon Toluiferæ, Kunth (N. O. Leguminosæ, Papilionaceæ).*

Officinal Preparations, U. S.

Tinctura Tolutana (10 per cent.). Dose, fʒj (4. Gm.).

Syrupus Tolutanus. (Tinct. f℥ij to Oj.) Dose, f℥ss–j (16. to 32. Gm.).

The Tinctura Benzoini Composita contains of Balsam of Tolu ℥j¼ in each pint.]

This agreeable preparation is almost exclusively used as a flavoring addition to cough mixtures, in the form of the syrup.

BELLADONNÆ FOLIA—BELLADONNA LEAVES.

[*The leaves of Atropa Belladonna, Linné (N. O. Solanaceæ).*]

BELLADONNÆ RADIX—BELLADONNA ROOT.

[*The root of Atropa Belladonna (N. O. Solanaceæ).*

Officinal Preparations, U. S.

From the leaves:—

Extractum Belladonnæ Alcoholicum. Dose, gr. ¼–ij (.016 to .13 Gm.).

Tinctura Belladonnæ (15 per cent.). Dose, gtt. x–xx (.65 to 1.30 Gm.).

Unguentum Belladonnæ. (Alcoholic extract, 10 per ct.)

From the root:—

Extractum Belladonnæ Fluidum. Dose, ♏ij (.13 Gm.).

Emplastrum Belladonnæ. (Representing 100 per cent. of the root.)

Abstractum Belladonnæ. Dose, gr. ½–j (03.–06 Gm.).

Linimentum Belladonnæ. (Fl. ext. 95, camphor 5 parts.)

Atropina. { Dose gr. $\frac{1}{60}$, or, hypodermically,
Atropinæ Sulphas. { gr. $\frac{1}{120}$ (.001 to .0005 Gm.).

ANTIDOTES.

Chemical. Fresh animal charcoal, tannin, vegetable astringents and the fixed alkalies.

Physiological. Opium, Calabar bean, tartrate of antimony and potassium, and pilocarpine.

In the treatment of belladonna-poisoning, the irritating emetics, such as mustard, ipecacuanha, and sulphate of zinc, should be exhibited to remove from the stomach any excess of the poison remaining unabsorbed. Apomorphine might be useful hypodermically (gr. $\frac{1}{20}$, repeated). Purgatives containing the chemical antidotes should then be given to neutralize any of the drug in the intestines. Symptoms of exhaustion should be treated as they arise, by artificial respiration, douches, counter-irritants, and diffusive stimulants. The physiological antidotes, being counter-poisons, should be used with the greatest care.]

LOCAL ACTION.

Belladonna is used externally, on account of its soothing properties, in various forms of *neuralgic* and *rheumatic pains*, in which cases the liniment, applied either alone, or in combination with chloroform liniment, often gives relief. It is also a good application in acute rheumatism, placed on cotton-wool, and thus encasing the swollen and tender joints. Belladonna is also useful, as has been specially pointed out by Mr. Heath, in *boils and abscesses*, where the suppurative process may be prevented or even arrested by its use. It is also a good application to inflamed *piles* and *fissure of the rectum*. It is also applied to the skin to check localized sweating, to the breast to arrest the secretion of milk, and to the neighborhood of the eye to dilate the pupil; but its actions here are so intimately associated with the theory of its internal administration that we will say no more on the subject at present.

Belladonna is very readily absorbed through the unbroken cuticle, and symptoms of poisoning have occasionally been caused by its local application.

INTERNAL ADMINISTRATION.

Physiological Action.	*Therapeutical Action.*
1. *On the Brain.*—After full doses of belladonna, a tendency to delirium sets in, usually of a joyful character, and attended by hallucinations and spectral illusions. Sleep generally follows.	1. Belladonna may be cautiously used as a hypnotic when other remedies fail. Ringer records an interesting case of acute mania in which the heroic dose of gr. j of atropine acted well by causing sleep.
2. *On the Spinal Cord.*—In frogs this action is very decided, for when atropine is injected below the skin the animal is at first paralyzed, lying quite motionless, with arrested breathing, which period of inaction is suddenly interrupted in about from one to eighteen hours by the occurrence of violent tetanic spasms.	2. It is used in some spinal affections in accordance with the principles of Dr. Brown-Séquard, explained under another section. It is also of value in checking the tendency which occasionally exists to nocturnal seminal emissions, when these become of exhausting frequency.
3. Belladonna paralyzes the terminal filaments of the third nerve applied to the circular or sphincter fibres of the iris, and thus allows the sympathetic, which rules over the radiating fibres, to come into unchecked play, and so dilate the pupil. At the same time we observe a diminution in ocular tension and imperfect vision, especially for near objects, due to paralysis of the power of accommodation. Gubler says that it also causes a diminished sensibility of the cornea and retina, with prolonged retention of images by the retina.	3. Belladonna, used more conveniently in the cleaner form of atropine, is in very extensive use in eye diseases to facilitate ophthalmoscopic examinations, and to keep the pupil freely dilated in iritis, and so lessen the risk of adhesion of its free margin to the lens, with subsequent contraction, distortion, and impairment of vision. It is also used to obviate protrusion of the iris through any hole in the cornea made by ulceration or accident, and it forms a soothing application to various painful affections. To dilate the pupil the liq.

He is rather inclined to believe that it has some special action on the muscular tissue of the iris.

The strong solution of the Br. P. must be used with caution, as acute glaucoma has undoubtedly followed its free application to the eye. Be careful to use perfectly fresh solutions, as *fungi* rapidly form, and may cause troublesome irritation, and the liq. atropinæ sulph. [Br. P.] is a more stable preparation than the liq. atropinæ [Br. P.] which is irritating because of the spirit which it contains.

4. The action of belladonna on the sympathetic nervous system is somewhat irregular, and to this is no doubt due some at least of that action on certain secretions which we shall shortly note more fully. But one symptom often observed, more especially in children, probably proceeds from vasomotor paralysis, and that is transient flushing and sweat-

atropinæ sulph. [Br., gr. iv ad f℥j] is now generally used, care being taken only to introduce a very small drop into the eye; for if a larger quantity is applied, the resulting effects and inconveniences, more especially the paralysis of accommodation, spoiling the eye for near work, may last from a week to twelve days, much to the annoyance of the patient. [Although weaker solutions take a little longer time to dilate the pupil and paralyze the accommodation, yet these effects are more transient and therefore more satisfactory to the patient. A gr. $\frac{1}{4}$ solution is strong enough for ordinary use, and will dilate the pupil in about half an hour after instillation.]

Belladonna being so readily absorbed, however, dilatation of the pupil will ensue on application of the extract or liniment for any length of time to any part of the body.

4. When we wish rapid and transient dilatation of the pupil, without complete relaxation of the ciliary muscle, we should use homatropine in preference to atropine. [Cocaine, in 2 to 4 per cent. solution, is still better, because the dilatation does not last more than a few hours, while with homatropine it may last one or two days.]

ing of the face now and then following a dose.

5. The influence of belladonna on the circulation is due to another nervous influence. Under the use of this drug we observe increased rapidity and force of cardiac action, and this is explained by a paralyzing action which it exerts on the terminal inhibitory filaments of the pneumogastric nerve distributed to the intimate structure of the heart, as well as on the nerve itself, thus differing from curare, which only affects the trunk of the nerve. It is proved by experiment that the sympathetic nerve supply has the power of causing very rapid action of the heart; but a rein is kept on this, and the proper balance of motive force is sustained by the pneumogastric nerve, which inhibits or restrains the impetuous action of the sympathetic. By paralyzing these inhibitory filaments, then, belladonna hands the heart over to the sympathetic, which, without rein or drag, runs riot, and we accordingly find that excessive increase in the heart's rapidity follows the injection of a moderate quantity of atropine.

Coincident with this we get raised arterial tension.

6. Belladonna contracts the small vessels, probably

5. Belladonna is an excellent cardiac tonic, increasing the regularity and strength of the contractions of the heart, more especially in failure of compensation in cases of mitral regurgitation. It is good practice to combine it with digitalis.

It is also a very soothing remedy in cases of irritable palpitation, and the old-fashioned belladonna plaster is certainly of use in these conditions.

6. Dr. Brown-Séquard recommends the use of bella-

not from nervous influence, but from a direct action upon the unstriped muscular fibres surrounding the arterioles.

7. *On Respiration.*—Belladonna tends to increase the rapidity of the breathing by stimulation of the respiratory centre.

8. It has the power of contracting unstriped muscular fibre in other situations than the arterial tubes. It probably does so both in the bladder and intestines, and it should be remembered that in cases where the expulsive power of the bladder is naturally weak, complete retention of urine may be produced by its administration.

donna in those cases of chronic inflammation of the spine leading to paralysis, where it acts well by contracting the vessels and diminishing the supply of blood to the affected part; and he gives it internally, and applies a plaster along the spine.

To this contracting influence on the small vessels is probably due the effect of belladonna in checking local inflammatory conditions; [and the power of atropine given in small dozes frequently repeated, to relieve *menorrhagia* and *hæmoptysis.*]

7. Atropine has been recommended as an efficient remedy in *asthma.*

8. Belladonna is an excellent remedy for the nocturnal *incontinence of urine* of children; but in order to do any good it must be boldly pushed, and I have been obliged to give as much as f℥jss or even f℥ij of the tincture [Ph. B., which is one-half the strength of that of the U. S. P.] before success was attained.

From its tonic influence on the muscular structures of the intestines it is an excellent adjunct to purgative pill-masses, from $\frac{1}{4}$ to $\frac{1}{2}$ grain acting well in combination with colocynth; or, even given

Action on Secretion.—9. *Salivary.*—It checks the salivary secretion, causing a peculiar sensation of dryness in the mouth and throat; and this is believed to be due to a remarkable selective action on the secretory branches supplied from the chorda tympani nerve to the submaxillary ganglion.

10. *Cutaneous.* — Belladonna most effectually arrests the action of the skin, and occasionally under its use a vivid red eruption, not unlike scarlet fever, breaks out.

Its anhidrotic action is explained by its paralyzing the ends of the nerves supplying the sweat-glands.

11. It also checks the secretion of the milk, used either locally or by internal use, and this is probably due to a paralyzing effect on the lacteal nerves.

alone with ext. of gentian, it will often secure a regular action of the bowels.

It is also very useful by relieving spasm, as in colic, and intestinal obstruction has occasionally yielded to large doses.

9. Belladonna has been used to check excessive salivation.

10. It is an excellent remedy for undue *sweating*, whether general, as in *phthisis* as originally recommended by Bartholow and Da Costa or in rheumatism; or local, as about the head of rickety children or the feet of some individuals. It may be either given in the form of succus, extract, or tincture, or better by the subcutaneous injection of atropine.

11. It is a most valuable remedy in cases where inflammation threatens in a breast, when the child has died or cannot suck, and the gland becomes congested from retention of its secretion. Here the external application of belladonna speedily diminishes the red, tense, shining aspect, relieves

	the wearing pain, and arrests the milk.
12. On the solid urinary constituents no special action has been noted, but it increases the flow, by raising the tension in the glomeruli of the Malpighian bodies.	12. It may therefore be recommended as a good diuretic.

Belladonna is also used under one of two conditions which cannot accurately be grouped under any specific heading.

Thus it has been vaunted in *whooping-cough*, but after careful and repeated trials with large and small doses, I am compelled to agree with Dr. Kelly that its action in this disease is too uncertain to be of much use. But in certain forms of spasmodic cough, simulating pertussis, or when the cough is merely an occasional, loud, clanging bark, I have derived much benefit from belladonna. In *epilepsy* and *chorea* it has been tried, but without marked success. [As a prophylactic against scarlet fever, belladonna has attained considerable reputation, perhaps undeservedly. It is to be given in small doses, continued twice or thrice daily until danger is over.]

The subcutaneous injection of atropine is said by Dr. Anstie to be of great service in *lumbago*, *sciatica*, and *chronic rheumatism*, and to be the best of all remedies for pain in the pelvic viscera. It has also been recently observed that the addition of a little atropine to the ordinary morphine injection tends to obviate the distressing faintness, pallor, and nausea which occasionally mar the efficacy of the subcutaneous mode of administering this valuable drug. Ringer recommends its use in irritative *dyspepsia*, giving from $\frac{1}{6}$ to $\frac{1}{4}$ gr. of the extract night and morning, and gradually increasing the dose. [A solution of atropine (one per cent.), if applied to an exposed nerve-pulp, is said to relieve toothache immediately.]

DRAWBACKS TO THE USE OF BELLADONNA.

Poisonous Symptoms and Antidotes.—Occasionally the use of atropine drops to the eye causes an erysipelatous inflammation about the lids and face, and patients often complain of the disfigurement and inconvenience arising from a widely dilated pupil. Liebreich (St. Thos. Hosp. Rep., vol. vii.) points out that the poisonous symptoms of atropine are occasionally developed by its introduction into the eye, and that they are due, not so much to absorption by the conjunctiva as to the fluid trickling through the lachrymal ducts into the nose, throat and stomach. This may be avoided by telling the patient to rinse his throat occasionally. He also notes conjunctivitis, erythema, eczema, and peculiar pearly granulations on the conjunctivæ, from the long-continued use of these drops. Minor degrees of belladonna-poisoning, however, need give us no uneasiness. Idiosyncrasy may also here be the source of inconvenience, and we may find persons affected with dryness of the mouth and throat after very small doses. This is always the first indication of the physiological action of belladonna, and is followed by a peculiar sensation of thirst and feverishness, without heightened temperature, rapid pulse and breathing, a red tongue; the face then flushes, delirium sets in, with great weakness, very hurried breathing, convulsions, and finally coma, which ends the scene. The antidotes are opium, which, within certain limits, is antagonistic to belladonna, animal charcoal, the fixed alkalies, which destroy its poisonous properties, and Calabar bean, which has been shown to be the physiological antidote. A direct physiological antagonism has also been shown to exist between atropine, muscarine, and jaborandi, or pilocarpine, which stimulate the intracardiac inhibitory apparatus, and slow the heart.

One curious point about belladonna is that, although so poisonous to man, its destructive influence is very various on other animals. The carnivora are much more readily affected by it than the herbivora, many of whom browse on it with impunity. Thus a horse has been known to eat eight pounds of the leaves without injury; blackbirds feed freely on the berries; and fifteen grains of atropine are required to poison a rabbit.

Dose and Mode of Administration.

Atropine may be given in phthisical sweating, in pill, in doses varying from $\frac{1}{400}$ grain (Bartholow) to gr. $\frac{1}{75}$ to $\frac{1}{25}$ [Da Costa]; but it is not very often used internally. In heart disease $\frac{1}{60}$ gr. of digitaline may be combined with $\frac{1}{60}$ gr. of atropine, and given by hypodermic injection. Discs of atropine (lamellæ atropinæ) have recently been admitted to the Br. P. They are composed of gelatine and glycerine, and each contains $\frac{1}{5000}$ gr. of sulphate of atropine.

It is well to note that children take not only without injury, but with benefit, much larger doses than adults, and, whilst I have seen a woman display well-marked physiological symptoms after a few 10-minim doses, I have often prescribed 20 minims of the [English] tincture for a child of two years without anything of the kind.

[ASTHMA CIGARETTES.

℞.	Belladonnæ fol.	gr. xcvj;	or (approximately)	6 50	Gm.
	Hyoscyami fol.,				
	Stramonii fol., āā	gr. xlviij;	or	3 25	"
	Ext. opii	gr. iv;	"	25	"
	Tabaci fol.	gr. lxxx;	"	5 30	"
	Aquæ bullientis	Oj;	"	500	

Macera per horam in vase leviter clauso, cola, et adde—

Potassii nitrat.	ʒij ℈ij;	or	10 60	Gm.
Potassii arsenitis	ʒv ℈j;	"	21 30	"

M. S. Saturate sheets of bibulous paper in this solution, dry and roll them, and use for fumigation as directed.

Phila. Hosp.]

[BENZINUM—BENZIN.

Petroleum benzine or petroleum ether is a purified distillate from American petroleum, consisting of hydrocarbons, chiefly of the marsh-gas series, and having a sp. grav. from 0.670 to 0.675, and boiling at 50° to 60° C. (122° to 140° F.). It should be kept in well-stopped bottles or cans in a cool place, remote from lights or fire. Used externally for rheumatic or neuralgic pains and for prurigo. Internally as a vermifuge, ♏xxx (2. Gm.).]

BENZOINUM—BENZOIN.

[*A balsamic resin obtained from Styrax Benzoin, Dryander (N. O. Styraceæ).*

OFFICINAL PREPARATIONS, U. S.

Adeps Benzoinatus (2 per cent.; Benzoinated lard). External use.

Acidum Benzoicum. (Enters into Tinctura Opii Camphorata.) Dose, gr. x–xxx (.65 to 2. Gm.).

Ammonii Benzoas. Dose, gr. x–xxx (.66 to 2. Gm.).
Lithii " " " "
Sodii " " " "

Tinctura Benzoini (20 per cent.). Dose, fℨss–fℨj (2. to 4. Gm.).

Tinctura Benzoini Composita (Benzoin 12, aloes 2, storax 8, tolu 4, alcohol q. s. ad 100). Dose, fℨj–ij (4. to 8. Gm.).]

LOCAL ACTION.

Physiological.

Tincture of benzoin is a stimulant to raw surfaces. [Benzoin has the property of preventing rancidity in ointments, etc., in hot weather.]

Therapeutical.

It is therefore occasionally used as an application to foul or indolent sores. [The compound tincture is a useful application to *cracked nipples.*]

INTERNAL ACTION.

Benzoin has the stimulating influence on mucous membranes possessed by most of the gum-balsams. During its passage through the blood it becomes converted into hippuric acid, and increases in some measure the acidity of the urine.

Benzoin may be prescribed with effect in advanced cases of *bronchitis,* and in some conditions of chronic irritation about the bladder.

It may be conveniently given in the form of the benzoate of ammonia.

The benzoate of sodium is a powerful hepatic stimulant.

R.	Tincturæ benzoini compositæ	fℨvj;	or	24	Gm.	
	Mucilaginis acaciæ	f℥j;	"	32	"	
	Syrupi zingiberis	f℥ss;	"	16	"	
	Aquæ menthæ piperitæ	f℥vj;	"	192	"	M.

S. Capiat unciam unam quartâ quâque horâ.

For advanced *bronchitis.*

[Benzoic acid, in combination with lime, has been used successfully in the albuminuria of pregnancy and in Bright's disease, by Dr. A. H. Smith, in doses of sixty to eighty grains a day.][1]

[[1] Proceedings Phila. Co. Med. Soc., vol. iii. p. 106.]

[OLEUM BERGAMII—OIL OF BERGAMOT.

A volatile oil extracted by mechanical means from the rind of the fresh fruit of Citrus Bergamia, var. vulgaris, Risso et Poiteau (N. O. Aurantiaceæ) (De Candolle).

Used almost exclusively as a perfume, and is an ingredient of Spiritus Odoratus. Used for flavoring pomades, etc.]

BISMUTHUM—BISMUTH.

[OFFICINAL PREPARATIONS, U. S.

Bismuthi Citras. Dose, gr. j–iij (.06 to 20. Gm.).

Bismuthi Subcarbonas. Dose, gr. xv–xlv (1. to 3. Gm.).

Bismuthi Subnitras. Dose, gr. v–xxx (.32 to 2. Gm.).

Bismuthi et Ammonii Citras. Dose, gr. ij–iv (.13 to .26 Gm.).]

LOCAL ACTION.

Physiological.	*Therapeutical.*
Bismuth has no action on the unbroken cuticle, but applied to a raw or mucous surface, it is sedative and astringent.	It is a good application to *intertrigo, ulceration about the mouth,* and as an injection in *gonorrhœa* and *leucorrhœa.* It has lately been recommended as a snuff to check *cold in the head,* and the liquor has been praised as an application to *prolapsus ani* (Cleland).

INTERNAL ACTIONS AND USES.

On Digestive Tract.—Bismuth is sedative to the stomach, and exerts an astringent influence over the intestines, probably in virtue of its local effects. [In large doses, the subnitrate of bismuth has caused fatal gastro-

Bismuth is one of our most valued remedies in many forms of *dyspepsia,* the main indications for its use being pain and vomiting. When a patient suffers acute pain after eating, with or without sickness, the tongue being clean enteritis. When hypodermically injected bismuth produces poisonous effects like those from gold or mercury. Soluble salts of bismuth, therefore, should never be given in as large doses as the others, very little of which enter the circulation. Bismuth usually contains a small proportion of arsenic.] and much flatulence present, we may give bismuth with much confidence; it is also of much service in the vomiting of drunkards, in *pyrosis*, and in many forms of *diarrhœa*, more especially that met with in children.

MODE OF ELIMINATION.

Very little bismuth is absorbed, and it is principally thrown out of the system by the intestines, to whose secretion it imparts a blackish hue, from the formation of a sulphide.

MODE OF ADMINISTRATION, ETC.

The subnitrate of bismuth, which is the most effective preparation, may be given simply in powder, either by itself or in combination with charcoal or soda; or it may be given in solution with hydrocyanic acid, or infusion of gentian; moderately large doses being preferable.

℞. Bismuthi subnitratis	ʒij;	or	8	Gm.	
Mucilaginis acaciæ	f℥j;	"	32	"	
Acidi hydrocyanici diluti	♏x–xx;	"	|65	"	
Infusi gentianæ q. s. ad	f℥vj;	"	192	"	M.

S. Sumat f℥ss ter die.

℞. Liquoris bismuthi et ammoniæ citrat. [Br.]	fʒiv;	or	16	Gm.
Syrupi aurantii,				
Infusi calumbæ, āā	f℥v;	"	160	

Misce. Sumat unciam unam ter in die.

℞. Bismuthi oxidi	ʒj;	or	4	Gm.	
Acidi oleici	℥j;	"	32	"	
Ceræ albæ	ʒiij;	"	12	"	
Petrolati	ʒix;	"	36	"	
Ol. rosæ	gtt. j;	"	|06	"	M.

A soothing ointment much recommended by Dr. McCall Anderson in *eczema*.

℞. Morphinæ hydrochloratis	gr. ij;	or	|13	Gm.	
Pulveris acaciæ	ʒij;	"	8	"	
Bismuthi subnitratis	ʒvj;	"	48	"	M.

Ft. pulv.

Ferrier's snuff, for cold in the head, influenza, and hay fever.

The carbonate and oxide of bismuth are seldom used, but an agreeable preparation, less effectual, however, than the subnitrate, is known as the liquor bismuthi et ammoniæ citratis (which contains gr. iij of the oxide to the drachm), and lozenges (containing each gr. ij of the subnitrate) are also included in the British Pharmacopœia.

BRAYERA—BRAYERA (KOUSSO).

[*The female inflorescence of Brayera anthelmintica, Kunth (N. O. Rosaceæ, Roseæ).*]

OFFICINAL PREPARATIONS.

Extractum Brayeræ Fluidum. Dose, fʒij–iv (8 to 16 Gm.).

Infusum Brayeræ (6 per cent.). Dose, f℥iv–viii (125 to 250 Gm.).]

EFFECTS.

Physiological.	*Therapeutical*
The action of kousso is poisonous to the tape-worm, without exerting any irritating or purgative effect. ["Of all the remedies for tape-worm none is more efficient or certain." (Stillé.)]	It is therefore occasionally used as an anthelmintic, and with moderately good effect when given on an empty stomach, according to the rules generally laid down.

MODE OF ADMINISTRATION, ETC.

It is well not to use the officinal tincture [Br.], but to get the fresh flowers, boiling about half an ounce in three or four ounces of water, adding a little lemon-peel, and directing the patient to swallow the whole draught, dregs and all. A little vomiting sometimes follows, but is seldom troublesome. [It is advised to use caution in administering Brayera during pregnancy, for fear of abortion. It contains about 3 per cent. of a white, or yellowish, crystalline, bitter, resin-like substance called *Kosin*, which is considered the active principle of the drug; 2 to 4 doses of grs. x–(.65 Gm.) being an efficient tænicide. It also contains a green resin, a volatile oil, tannic acid, etc.]

BROMUM—BROMINE.

[*A liquid non-metallic element, obtained from sea-water, having an irritant, suffocating odor.*

Dose, gtt. ij–iij (.13 to .20 Gm.), largely diluted with water.

Officinal Preparations, U. S.

Ammonii Bromidum. Dose, gr. xx–xxx (1.30 to 2. Gm.).

Calcii Bromidum. Dose, gr. xv–xxx (1. to 2. Gm.).

Potassii Bromidum. Dose, gr. x–ʒj (.65 to 4. Gm.).

Lithii Bromidum. Dose, gr. v–xx (.32 to 1.30 Gm.).

Sodii Bromidum. Dose, gr. x–ʒj (.65 to 4. Gm.).

Zinci Bromidum. Dose, gr. j (.065 Gm.).

Syrupus Ferri Bromidi (10 per cent.).

Acidum Hydrobromicum Dilutum (10 per cent. absolute hydrobromic acid). Dose, ʒj–ij (4. to 8. Gm.). (See page 114.)

Camphora Monobromata. (See Camphor.)

Antidote.

Ammonia, followed by the customary treatment for irritant poisons.

[Bromine, used as a lotion in olive oil (♏x to ℥j), is said to be a specific for the eruption of poison-ivy, *rhus toxicodendron.*

Bromine is a valuable caustic, and is sometimes used in gynecology as an application to the uterus. It is said that its mixture with glycerine and alcohol is liable to explode. It is useful in hospital gangrene both pure as a caustic, and in dilute solution as an antiseptic wash. Used internally, it resembles iodine in its effects as an alterant.]

Bromine being never used to any extent in medicine, we shall consider its properties under Bromide of Potassium.

[At the Ninth International Congress, held at Washington in 1887, Dr. De Witt C. Wade, of Holly, Michigan, presented the following formula for making extemporaneously the officinal Dilute Hydrobromic Acid: Bromide of Potassium, ℥iv; tartaric acid, ℥v; water, f℥vii. Dissolve the salt in the water and add the acid. When thoroughly mixed set aside to precipitate potassium bitartrate. Decant the supernatant fluid and dilute with water f℥xvi. The result is a ten per cent. solution by weight of hydrobromic acid.[1]]

[[1] Transactions of the Ninth International Medical Congress. Vol. III., p. 75.]

[BRYONIA—BRYONIA.

The root of Bryonia Alba, and of Bryonia Dioica, Linné (N. O. Cucurbitaceæ).

OFFICINAL PREPARATION.

Tinctura Bryoniæ (10 per cent.). Dose ♏v–fʒij (.30 to 8 Gm.).

Bryonia is an irritant diuretic and drastic purgative, and causes congestive headache, sometimes vomiting or gastritis. It has been used for the second stage of serous inflammations and in rheumatism after fever has subsided. It can be given with good results in ordinary colds, with pain and stiffness. Its purgative qualities have suggested its use in dropsies]

BUCHU—BUCHU.

[*The leaves of Barosma Betulina, B. Crenulata, and B. Serratifolia (N. O. Rutaceæ, Diosmeæ).*

OFFICINAL PREPARATION, U. S.

Extractum Buchu Fluidum. Dose, fʒss–j (2. to 4. Gm.).]

Physiological.

The physiological action of Buchu is principally if not entirely expended on the mucous membrane of the genito-urinary organs. It is probable that the volatile oil which it contains, being rapidly taken into the blood and as rapidly excreted by the kidneys, acts locally through the urine on the lining membrane of the bladder and urethra. [It is also, to some extent, diaphoretic.]

The urine is impregnated with the peculiar odor of the drug, and is perhaps slightly increased in quantity.

Therapeutical.

Buchu has long been valued by surgeons as a useful remedy in *chronic catarrh of the bladder* and the various mucous discharges from the genito-urinary organs depending on a relaxed condition of the affected parts. [It is largely employed in the treatment of subacute or chronic gonorrhœa, resembling oil of turpentine in its effects, although less stimulating. In incontinence or retention of urine, depending upon want of tone in the bladder, it is a most useful agent.]

CAFFEINA—CAFFEINE.

[*A proximate principle of feebly alkaloidal power, generally prepared from the dried leaves of Camellia thea, Link (N. O. Ternstrœmiaceæ), or from the dried leaves of Caffea Arabica, Linné (N. O. Rubiaceæ), or from Guarana, and occurring also in other plants.*]

Tea, coffee, guarana, and coca, substances containing the same alkaloid, caffeine, have much the same effect.

Caffeine is a very active substance, causing at first increase, but later diminution, of the reflex functions of the cord, with nervous convulsions and muscular rigidity, the motor nerves not being affected. The heart's action is at first accelerated, but afterwards retarded. The excretion of urea is lessened.

The frequent and prolonged use of tea and coffee causes, in some persons, a variety of nervous sensations, sleeplessness, numbness and tingling of the extremities, with irritability of the heart; and there is no doubt that much loss of appetite and flatulent dyspepsia originate in the habit of drinking tea shortly before or after meals. The invigorating and restorative effects of tea or coffee are well known, and valued by persons undergoing much bodily fatigue. The therapeutic indications for tea and coffee are almost restricted to the administration of the latter substance in cases of *opium-poisoning.* Citrate of caffeine in two-grain doses has been highly recommended in nervous and sick headache. It is also in doses of three grains and upwards an efficient diuretic, acting by directly stimulating the renal cells without raising the blood pressure. It increases at first, but afterwards diminishes the excretion of urea. Dr. Thorowgood praises it highly in *asthma*—best given in warm coffee.

Guarana in twenty-grain doses has been found a useful remedy for *migraine* or sick headache.

[CALAMUS—CALAMUS (SWEET FLAG).

The rhizome of Acorus Calamus, Linné (N. O. Araceæ).

OFFICINAL PREPARATION.

Ext. Calami Fluidum. Dose, ♏ x–xv (.65 to 1 Gm.).

In small quantities calamus is tonic and carminative.]

[OLEUM CAJUPUTI—OIL OF CAJUPUT.

A volatile oil distilled from the leaves of Melaleuca Cajuputi, Roxburgh (N. O. Myrtaceæ).

Cajuput oil is highly prized in the East Indies as a stimulant carminative. The ordinary dose is gtt. ij–v (.12 to .32 Gm.), but it has been given with great success in the collapse of cholera, in doses of gtt. xv to fʒj (1. to 4. Gm.). It is also used as a rubefacient and counter-irritant, diluted with olive oil. Like other oils of this class, it relieves toothache when introduced into a carious tooth.]

CALCIUM—CALCIUM.

[**Calcii Chloridum**—(Chloride of calcium prepared by fusion.) Dose, gr. v–xx (.30 to 1.30 Gm.).

Calcii Hypophosphis—Hypophosphite of lime. Dose, gr. x–xxx (.65 to 2. Gm.).

Calx—(Lime recently prepared by calcination.) Quicklime.

Calx Chlorata — A compound resulting from the action of chlorine upon hydrate of calcium, and containing at least 25 per cent. of available chlorine. (Used as disinfecting agent in powder or solution.)

Calx Sulphurata—A mixture (commonly misnamed Sulphide of Calcium) consisting chiefly of sulphide of Calcium and sulphate of Calcium, in varying proportions, but containing not less than 36 per cent. of absolute chloride of Calcium, U. S. Dose, gr. ¼ to ij. (.015 to .13 Gm.)].

OFFICINAL PREPARATIONS, U. S.

Calcii Bromidum. Dose, gr. xv–xxx (1. to 2. Gm.).

Calcii Carbonas Præcipitatus. Dose, gr. x–xl (0.65 to 2.60 Gm.).

Calcii Phosphas Præcipitatus. Dose, gr. x–xxx (.65 to 2. Gm.). (Syrupus Calcis Lactophosphatis.)

Creta Præparata. Dose, gr. x–xv (.65 to 1. Gm.).

Syrupus Hypophosphitum (Lime Hypophosphite gr. iij, Potassium hypophosph. and Sodium hypophosph. āā gr. j in fʒj). Dose, ʒss–ij (2.–8. Gm.).

Syrupus Hypophosphitum cum Ferro (Ferri Lactas 1, Syr. Hypophosphitum 99 parts). Dose, ʒss–j (2 to 4 Gm.).

Syrupus Calcii Lactophosphatis (grs. x in each ℥j). Dose, gr. i–iv (4–16 Gm.).

Syrupus Calcis (5 per cent. Calcium Hydrate). Dose, ♏xx–lx (1.30–4 Gm.).

Hydrargyrum cum Creta (Mercury 38 pts., Sugar of Milk 12 pts., Chalk 50 pts.). Dose, gr. v–xxx (.32 to 2. Gm.).

Trochisci Cretæ. (Each 4 grains Prepared Chalk.)

Pulvis Cretæ Compositus (Prepared Chalk 30, Acacia 2, Sugar 50 parts).

Mistura Cretæ (Compound Chalk Powder 20 parts, with Cinnamon Water 40 and Water 40 parts). Dose, f℥ss (16 Gm.).

Liquor Calcis (0.15 per cent. of Calcium Hydrate). Dose, fʒj–iv (4. to 16. Gm.). Lime-water.

Linimentum Calcis (equal parts of Lime-water and Cotton-seed oil).

Potassa cum Calce (equal parts of Potassa and Lime, Vienna paste). Used as a caustic. Vienna paste.

Also used in the preparation of Æther Fortior, Ammonii Valerianas, Aqua Ammoniæ, Liquor Potassæ, Liquor Sodæ, Liquor Sodæ Chloratæ, Quininæ Sulphas, Santoninum, Spiritus Ammoniæ, Strychnina and Sulphur Præcipitatum.]

LOCAL ACTION.

Physiological.

Some of the preparations of lime, used externally, are sedative or soothing; others are astringent.

Therapeutical.

Lime is used as a soothing application to burns, as in the linimentum calcis; and lime-water makes a good injection for *leucorrhœa*, or enema for the destruction of *thread-worms.*

[In croup and diphtheria, great relief is afforded by breathing the vapor of slaking lime, or simply atomized lime-water.]

INTERNAL USES.

Lime, taken internally, neutralizes acid secretions, and has astringent properties.

It is therefore used with benefit in some forms of *dyspepsia* and in *diarrhœa*, liquor calcis being the most generally employed preparation. Lime-water is also of great service in preventing the curdling which often causes milk to disagree with patients of weak digestion.

Chalk is more astringent than lime, and is an excellent remedy, either alone or in combination with opium, for *diarrhœa*.

Chloride of calcium has been highly praised as a remedy for various forms of *scrofula*. [The dose of fused chloride of lime (not calx chlorata) is gr. x–xx (.65 to 1.30 Gm.), but it is rarely prescribed.]

Phosphate of lime has been highly praised by Ringer in doses of gr. j to ij (.06 to .12 Gm.) in *rickets*, where it acts by improving the general nutrition of the system, and supplying structural elements in which the growing bones of badly nourished children are often deficient; the best time for administration being after the acute stage has passed away, as indicated by the cessation of tenderness. It is also of service in anæmia, general debility, and some forms of diarrhœa, etc. More than gr. j to ij is useless, as it will not be absorbed.

The sulphide of lime is useful in acne, hordeolum, and the furuncular diathesis, when boils appear in crops.

It is also a good remedy in strumous ophthalmia and the scrofulous sores of children. Dose gr. $\frac{1}{4}$, in a few grains of sugar of milk, or better in perles, which prevent decomposition and conceal the disagreeable odor of the drug.

Thorowgood much values the hypophosphite of lime in phthisis.

[Freshly calcined lime has some value as a *disinfectant*, as it destroys organic matter by oxidation. For cesspools, or sewers, it is less useful than copper sulphate and other disinfectants, unless it is used freely and in large quantities. Lime-wash applied to walls will aid in disinfecting a room.]

[CALENDULA—CALENDULA (MARIGOLD).

The fresh flowering herb of Calendula Officinalis, Linné (*N. O. Compositæ*).

OFFICINAL PREPARATION.

Tinctura Calendulæ (20 per cent.). Dose, ʒss–ij (2. to 8. Gm.).]

Marigold contains some volatile oil, an amorphous bitter principle, yellow coloring matter, etc. It is reputed to possess tonic, alterative, antispasmodic, diaphoretic, and emmenagogue properties. As the Pharmacopœia directs that only the fresh plant is to be used, it can only be prescribed in the form of the tincture, which has also been used for the same purposes as tincture of arnica, and is a satisfactory substitute for it in *sprains*, *bruises*, etc.]

CALUMBA—CALUMBA (COLUMBO).

[*The root of Jateorrhiza Calumba* (*Miers*), (*N. O. Menispermaceæ*).

OFFICINAL PREPARATIONS, U. S.

Extractum Calumbæ Fluidum. Dose, ♏xv–xxx (1. to 2. Gm.).

Tinctura Calumbæ (10 per cent.). Dose, fʒj–ij (4. to 8. Gm.).]

LOCAL ACTION.

Calumba has no local action.

CONSTITUTIONAL ACTION.

Physiological.

On the Digestive Functions.—Like all bitter tonics, calumba stimulates the appetite, and increases slightly the secretion of saliva and the gastric juice. It is lighter and more agreeable than some others of the class, and has been believed to have sedative properties, in virtue of which it may be bene-

Therapeutical.

Calumba is a good tonic in deficient appetite from indigestion or simple want of tone, in various dyspeptic conditions, and in most enfeebled states of the constitution, from whatever cause they may arise. [As it does not contain tannic acid, it may be given in combination with iron.]

ficially given in sickness and vomiting; but of this we have been unable to obtain reliable evidence.

Mode of Administration.

Calumba is usually given in combination either with iron, with alkalies, or with other tonics. Thus:—

℞. Ferri et potassii tartratis	ʒiss;	or	6		Gm.
Potassii bicarbonatis	ʒij;	"	8		"
Syrupi hemidesmi [Br.]	f℥j;	"	32		"
Infusi calumbæ	f℥vij;	"	224		"

Misce, fiat mistura. Capiat unciam unam bis in die.

℞. Pulveris calumbæ	gr. x;	or		65	Gm.
Sodii bicarb.	gr. xx;	"	1	30	"
Pulv. rhei	gr. v;	"		32	"
Pulv. zingiberis	gr. x;	"		65	"

M. Fiat pulvis bis in die sumendus ante cibum.

A useful powder in some forms of dyspepsia.

CALX—LIME.

(See Calcium.)

CAMBOGIA—GAMBOGE.

[*A gum resin obtained from Garcinia Hanburii, Hooker filius (N. O. Guttiferæ).*

Dose, in substance, gr. ij–iij (.12 to .20 Gm.).

It enters into Pilulæ Catharticæ Compositæ.]

Local Action.

Gamboge has no local action, and differs from some other remedies of the same class in not exerting its purgative effects when applied to a raw surface or injected into the cellular tissue.

Constitutional Action.

Physiological.

On the Digestive and Secreting Organs.—Gamboge exerts a good deal of irri-

Therapeutical.

Gamboge is a drastic, hydragogue cathartic, formerly much used where free purgatating effect, acting more especially on the small intestines, and producing the discharge of large quantities of watery fluid. If given in sufficient quantity, inflammation and ulceration of the stomach and intestines may supervene, and death has followed the administration of a single drachm of the powder. It is also usually looked upon as a diuretic, but no trustworthy evidence has been given of its efficacy in this direction. tion of watery fluid seemed to be indicated, as in *cardiac dropsy;* but it is not only disagreeable and irritating, but uncertain, and has therefore been in great measure superseded by other remedies on which more dependence can be placed. It has been shown by Rutherford to stimulate the intestinal glands, but not the liver.

Absorption, Mode of Elimination, etc.

In order to insure its full absorption it seems necessary that gamboge must be previously dissolved in the bile, as we have seen that local application does not produce any purgative effect. It is, of course, thrown out in great measure by the intestines, but the coloring matter is excreted by the urine, to which it imparts a bright yellow tinge.

Mode of Administration, Dose, etc.

The great objection to the use of gamboge is its uncertainty, as we can never precisely foresee the cases in which it will cause troublesome vomiting and purging. To try and obviate this, therefore, as well as to conceal its acrid taste, we generally combine it with other drugs; but on the whole I think I am justified in saying that gamboge has no therapeutic advantage which cannot be obtained more conveniently and agreeably by the use of other purgative drugs.

We may most conveniently prescribe the compound pill (P. Br.), which contains gamboge, aloes, cinnamon, hard soap, and syrup, and of which the dose is from 5 to 15 grains.

[The compound cathartic pill (U. S. P.) contains: Abstract of jalap, gr. j; calomel, gr. j; compound extract of colocynth, gr. j⅓, and gamboge, gr. ¼. It is a good purgative, but often gripes; this might be obviated by the administration of a carminative at the same time. Dose, one to three pills.]

CAMPHORA—CAMPHOR.

[*A stearopten derived from Cinnamomum Camphora, F. Nees and Ebermaier (N. O. Lauraceæ), and purified by sublimation.*

Dose, in substance, gr. i–ij (.06 to .13 Gm.).

Officinal Preparations, U. S.

Aqua Camphoræ. (About gr. iv to each ounce.) Dose, fʒj–f℥ss (4. to 16. Gm.).

Linimentum Camphoræ (camphor 20 pts., cotton-seed oil 80 pts.). External use.

Linimentum Saponis (soap 10, camphor 5, oil of rosemary 1, alcohol 70, water q. s. ad 100 pts.). External use.

Spiritus Camphoræ (10 per ct.). Dose, ♏v–x (.32 to .65 Gm.).

Tinctura Opii Camphorata (Paregoric Elixir: see Opium.) Dose, f℥ss (16. Gm.).

Ceratum Camphoræ (3 per ct.). External use.

Camphora Monobromata. Dose, gr. ij–x (0.13 to .65 Gm.).

It also enters into Linimentum Belladonnæ, Linimentum Sinapis Compositum, Mistura Chloroformi, and Pulvis Morphinæ Compositus.]

Antidotes.

Opium and stimulants.]

Local Effects.

Physiological.	*Therapeutical.*
Camphor has some rubefacient properties, reddening and irritating the skin.	Camphor forms an ingredient of most of the liniments in common use.

Internal Action.

1. *Brain and Nervous System.*—Camphor in large doses causes a good deal of giddiness and confusion of ideas, even amounting in some cases to delirium.	1. Camphor is not used on account of its action on the nervous system, and the results of the few experimenters who have been bold enough to try the effects of large doses on themselves
Muscular weakness is at	

first observed, but this rapidly gives way to violent epileptiform convulsions and almost maniacal excitement. In frogs, well-marked lowering of the reflex irritability of the spinal cord has been observed.

2. *Circulation.*—In small doses camphor seems to stimulate the heart's action, but after the administration of larger quantities great cardiac prostration has been observed by Dr. Geo. Johnson and others.

3. *Respiration and Temperature.*—No influence on the respiration is noted, but there is a marked lowering of temperature.

4. *Digestive and Secreting Organs.*—In large doses, some irritation of the gastro-intestinal mucous membrane has been observed, with diaphoresis, and the sexual appetite seems to be diminished.

have not been of a very encouraging nature. The bromide of camphor [camphora monobromata] is a good remedy in nervous palpitation, and in irritation of the urinary and generative organs, and has a decidedly lowering influence on the temperature. [It is moderately stimulating and diaphoretic, and possesses anodyne and narcotic influence. In the spasmodic and nervous complaints of women, camphor is occasionally employed.]

2. Camphor has been found of service in the early stages of *coryza*, but must be here used with caution, as the homœopathic tincture, which is generally prescribed, is now known to be a very strong preparation, and Dr. George Johnson and others have described cases in which excessive weakness and faintness, with great cardiac and muscular prostration, followed doses of from 15 to 20 minims.

4. Camphor is said to be a good remedy in summer *diarrhœa*.

It is a popular antidote in *chordee*.

[HOPE'S CAMPHOR MIXTURE.

℞.	Acid. nitrosi	fʒj;	or	4	Gm.
	Tinct. opii deod.	♏xl;	"	2 60	"
	Aquæ camphoræ	q. s. ad fʒviij;	"	256	M.

Dose, a tablespoonful, after each evacuation.

For dysentery.]

[CANNABIS AMERICANA—AMERICAN HEMP.

Cannabis Sativa, Linné (N. O. Urticaceæ, Cannabineæ), grown in the Southern United States and collected while flowering.

(No officinal preparations.)]

CANNABIS INDICA—INDIAN HEMP.

[*The flowering tops of the female plant of Cannabis Sativa, Linné (N. O. Urticaceæ, Cannabineæ), grown in the East Indies.*

OFFICINAL PREPARATIONS, U. S.

Extractum Cannabis Indicæ. Dose, gr. ½ (.03 Gm.).

Extractum Cannabis Indicæ Fluidum. Dose, ♏ ½–1 (.03 to .06 Gm.).

Tinctura Cannabis (20 per cent.). Dose, gtt. x–xx (.65 to 1.30 Gm.).]

LOCAL ACTION.

Indian hemp is never used locally.

INTERNAL ACTIONS.

Physiological.

1. *On Brain and Nervous System.*—Indian hemp, like opium, possesses a double exciting and sedative action, the brain being stimulated into pleasant exhilaration before sleep sets in. This preliminary effect, however, is more powerful and lasting than in the case of opium,

Therapeutical.

1. Indian hemp may be used as a narcotic when other remedies fail; but its action is so uncertain and irregular, and the difficulty of procuring reliable preparations so great, that our present knowledge does not enable us to lay down any practical rules for its employment. Dr.

and the subsequent condition of slumber is usually disturbed by dreams and spectral illusions. Various authors have given graphic descriptions of the intellectual disturbance produced by this drug, dwelling more especially on a peculiar feeling of double consciousness, leading on, in some cases, to partial catalepsy.

We also find indications of some special affection of the sensory nerves, a marked degree of numbness and tingling, ushering in cutaneous anæsthesia and diminution of the muscular sense.

2. *Circulation.*—Some increased rapidity of pulse has been observed during the action of Indian hemp; but it is probable that this is only due to the condition of nervous excitement which we have just described.

3. *Digestive System.*—No special effect seems to be produced on the stomach or intestinal canal, and the absence of constipation following its use gives Indian hemp one advantage over opium.

Clouston, however, has obtained valuable assistance in *acute mania* by prescribing the tincture in combination with bromide of potassium. Although later experience has not confirmed the pretensions of those who formerly vaunted Indian hemp as a cure for *hydrophobia*, *chorea*, *tetanus*, and allied nervous ailments, we may sometimes produce good results in *neuralgia* and *migraine* by its cautious use.

DOSE AND MODE OF ADMINISTRATION.

℞ Tincturæ cannabis Indicæ	fʒj;	or	4	Gm.
Mucilaginis acaciæ	f℥j;	"	32	"
Syrupi zingiberis	f℥ss;	"	16	"
Aquæ menthæ piperitæ	f℥vj;	"	192	"

Misce, fiat mistura. Capiat unciam unam quartâ quâque horâ.

In *neuralgia*, etc.

CANTHARIS—CANTHARIDES (SPANISH FLIES.)

[*Cantharis vesicatoria, De Geer* (*Class Insecta; Order Coleoptera*).

OFFICINAL PREPARATIONS, U. S.

Tinctura Cantharidis (5 per cent.). Dose, ♏iij–v (.20 to .32 Gm.).

Ceratum Cantharidis. (For spreading blisters.)

Ceratum Extracti Cantharidis. (External use.)

Charta Cantharidis. (Blistering paper. External use.)

Collodium cum Cantharide (60 per cent.).

Linimentum Cantharidis (Cantharis 15, Ol. terebinth q. s. ad 100 parts).

Emplastrum Picis cum Cantharide.

POISONING.

Cantharides is an acrid and corroding animal poison. Its prominent symptoms are a burning sensation in the throat; violent pain in the stomach and bowels; nausea, vomiting, and purging—the ejections being frequently bloody and purulent; great heat and irritation of the urinary organs, sometimes the most painful priapism; pulse quick and hard; and convulsions, tetanus, delirium, and syncope.

The morbid appearances are principally inflammation and erosion of the stomach. If in substance, fragments of the flies, with their characteristic green, shining appearance, will be found adhering to the mucous coat, or mixed with the contents of the stomach; there are also marks of inflammation in the intestines and urinary organs, but these are most evident when death does not soon follow the ingestion of the poison.

Treatment.—The promotion of vomiting by means of warm demulcents; copious dilution, bleeding, the warm bath, opiate frictions, enemata of mutton-broth, laudanum, etc. Camphor, though not an antidote, alleviates some of the most distressing symptoms; the bromides are also serviceable. In extreme cases the administration of an anæsthetic may be necessary.

ANTIDOTE.

There is no antidote for cantharides.]

EXTERNAL ACTIONS.

Physiological.

The first effect of the application of cantharides to the skin is tingling and smarting, speedily followed by vivid redness and severe burning pain. To this succeeds the formation of large blebs, containing a watery fluid rich in albumen and fibrine; and if the blister be allowed to remain for any lengthened period in contact with the skin, ulceration and sloughing may supervene. It has been found that the moderate counter-irritant action of cantharides causes the copious exudation of white blood-corpuscles into the subcutaneous areolar tissue, with engorgement of the more superficial structures underlying the skin, whilst the deeper strata look pale, anæmic, and flabby; the lungs even being affected in this way. It has also been shown that the irritant action of cantharides may penetrate through the skin, and cause redness and inflammation of the pleura and peritoneum. The first constitutional effect of a blister is a slight elevation and subsequent depression of the temperature, with weakening of the action of the heart.

It not uncommonly happens that cantharides may be absorbed through the skin,

Therapeutical.

Blisters are used to fulfil the following indications :—

1. To relieve pain. There can be no doubt that blisters frequently check pain most effectually, as in *subacute pleurisy*, *pleurodynia*, *gastralgia*, *sciatica*, and *neuralgia*, it being important that in this last-named affection the counter-irritant should be placed as near as possible to the root of the affected nerve.

2. To check inflammatory conditions. There is no doubt that some local inflammations may be checked by blistering a neighboring vascular area. Thus, in *iritis* and some other inflammatory affections of the eye, benefit may be procured in this way; and in acute *rheumatism* blisters applied immediately above the inflamed joints rapidly remove pain and swelling.

On this principle, also, Mr. F. Jordan recommends his iodine treatment of localized surgical affections already referred to.

In how far inflammations of internal organs may thus be treated with advantage is a somewhat open question: for although the withdrawal of blood from the deeper structures might theoretically be considered beneficial, it is practically found that the and cause kidney irritation, indicated by difficult and painful micturition and the passage of blood.

[Blisters are spread with the cerate and not with the ointment of cantharides; the prescription being in this form :—

℞. Cerati cantharidis q. s.
Ft. emplastrum 2×2 in.
S. Apply as directed.

A better method of making blisters however is mentioned at the end of the article on the next page.]

pain and annoyance of blisters add to the feverish discomfort of the victims of acute disorders.

3. To promote absorption. Blisters are supposed to aid the absorption of effused products, fluid or solid, and are therefore much used in *thoracic dropsy*, either pleural or pericardial, the latter stages of *pneumonia*, *chronic joint-disease*, etc.

4. To stimulate and alter vascular or nervous functions, etc. Blisters may be employed to rouse patients from the stupor of *typhus*, or *narcotic poisoning*, or various *brain affections*, to check obstinate vomiting, and under various other conditions laid down in works on practical medicine.

INTERNAL ACTION.

Physiological.

Cantharides is a gastro-intestinal irritant, and also a renal stimulant and diuretic, causing an increased flow of urine, but frequently giving rise to a good deal of strangury, with painful, frequent, and difficult micturition, and bloody urine. This irritation may spread by sympathy to other allied organs, and uterine excitement on the one side, or excess of venereal appetite with chordee and seminal emissions on the other, may follow the administration of large doses.

Therapeutical.

Cantharides is not much used internally, on account of its irritating properties. It is, however, occasionally prescribed in *pyelitis* and some chronic affections of the kidney, and in chronic diseases of the spine.

Some authorities also have praised it highly in psoriasis. It has also been used for the purpose of procuring abortion, and it possesses emmenagogue properties.

CAUTIONS. MODE OF ADMINISTRATION.

We must use blisters with caution under the following circumstances:—

In the aged, infirm, or very young, where troublesome ulceration is apt to ensue.

In acute inflammatory conditions, and more especially those of the kidney.

To cicatricial tissue, or to parts deprived of some of their vitality by the withdrawal of nervous influence, as in paraplegia.

Blisters are usually kept on from ten to twenty hours, but we may well limit the period to six or eight hours, and develop the blebs by a subsequent poultice. When the desired effect has been produced, let out the watery fluid, and apply a thick layer of cotton-wool.

[A good method of making blisters without pain is to apply collodium cum cantharide, or blistering collodion, over the desired area. If well applied it is efficient, prompt, and painless, and does not cause strangury. No poulticing is needed, as a rule, the application of a piece of waxed paper or oiled silk to protect it from the air only being employed. The epidermis over the blister should not be removed.]

CAPSICUM—CAPSICUM.

[*Syn. Cayenne and African Pepper.*

The fruit of Capsicum fastigiatum, Blume (N. O. Solanaceæ).

In substance. Dose, grs. v–x (.30 to .65 Gm.).

OFFICINAL PREPARATIONS, U. S.

Extractum Capsici Fluidum. Dose, ♏ v–x (.30 to .65 Gm.).

Oleo-Resina Capsici. Dose, gtt. ½ to iij (.03 to .20 Gm.).

Tinctura Capsici. Dose, f℥–ij (4. to .8 Gm.).

Emplastrum Capsici. (4 sq. in. or 10 cm contains gr. 4, or .25 Gm., of the oleo-resin).]

This is a topical stimulant to the mucous membranes, exciting the appetite in small doses, but in larger quantities causing gastro-enteritis. In some forms of sore throat, as in the early stage of *tonsillitis*, or in simple relaxation of the mucous membrane, it forms a useful addition to a gargle as infusum capsici.

Recently it has been highly praised by Dr. Lyons, of Dublin, in ten-minim doses of tincture before meals, for the relief of the nausea, depression, and drink-craving of the confirmed dipsomaniac.

℞.	Tincturæ capsici,				
	Tincturæ nucis vomicæ, āā	♏x;	"	60 Gm.	
	Acidi nitrici diluti	♏xx;	" 1	30 "	
	Aquæ q. s. ad	f℥j;	" 32	"	M.

Fiat haustus ter in die sumendus.

Useful in drink-craving.

CARBO-ANIMALIS—ANIMAL CHARCOAL.

[*Animal Charcoal prepared from bone.*]

CARBO LIGNI—WOOD CHARCOAL.

[*Charcoal prepared from soft wood.*

OFFICINAL PREPARATION.

Carbo Animalis Purificatus.
(Used in pharmacy.)]

LOCAL ACTION.

Physiological.

Charcoal has no purely local action on any tissue with which it is brought in contact, and as it is quite insoluble it can exert no general influence on the functions of the body. It is therefore simply a mechanical agent and acts in virtue of the following properties:—

1. It not only freely absorbs gases within its pores, but oxidizes and destroys

Therapeutical.

1. In virtue of its absorbing powers, charcoal is used in many of those cases of *dyspepsia* where large quantities of gas are formed by premature decomposition of the food, and where much pain, nausea, and want of appetite are experienced by the patient. In *consumption* and many chronic stomach disorders, charcoal acts well by relieving the flatulence which

those of an offensive and injurious nature, as sulphuretted hydrogen; and further, it also deodorizes, by oxidation, and destroys organic impurities of all kinds, thus decolorizing solutions which contain them. It is extremely doubtful, however, in how far the explanation usually given of the therapeutic action of charcoal is satisfactory. We know that moisture destroys its absorptive powers, and the dose given must be too small to exert any real influence over gases contained in the stomach or intestines. More probably it acts mechanically by the small insoluble particles stimulating the mucous membrane and causing its vessels to contract. (Brunton.)

2. Animal charcoal possesses the power of rendering various vegetable poisons inert by placing them in a form of combination beyond the absorptive powers of the stomach.

is often the chief discomfort of the sufferer. Charcoal is also an excellent deodorizer and antiseptic, and is used for these purposes in the construction of filters, contact for four months being sufficient to purify the foulest and most deeply stained waters; and if the organic matter present does not exceed from 1 to 2 grains per gallon the charcoal will permanently retain its cleansing properties. It may also be of great service in absorbing and destroying offensive effluvia in the neighborhood of sewers or drains, and it used to be a fashionable application to unhealthy *ulcers;* but cleaner and equally effective antiseptics have now entirely displaced it from popular favor.

It is also occasionally employed in the formation of respirators and as an adjunct to tooth powders.

2. If we are called very early to a case of *poisoning* by *opium*, *aconite*, *strychnine*, or other vegetable poison, we may hope to do some good by charcoal, provided that absorption of the poisonous agent has not yet taken place to any extent.

Mode of Administration.

As a medicinal agent vegetable charcoal alone is used, and may be given in doses of from a tea- to a table-spoonful, great care being taken to insure perfect freshness, as its absorptive powers are seriously impaired by keeping. It may be combined effectively with bismuth, or given in sandwich form between bread and butter, or moistened with spirit in a wineglass before suspension by water; but in any case its unsightly appearance, gritty consistence, and insolubility interfere with its prescription in elegant form, and we may advise our patients with advantage to make use of the varieties of biscuits, lozenges, and capsules, which the ingenuity of chemists has devised.

As an antidote, animal charcoal must be given in considerable doses, as it is calculated that half an ounce is required to neutralize one grain of vegetable alkaloid. As an antiseptic it may be placed in shallow pans close to the outlet of drain or sewer ventilating shaft [in order to serve as a danger signal].

[CARBONEI BISULPHIDUM — BISULPHIDE OF CARBON (CS_2–76).

This compound corresponds in composition with carbon dioxide (CO_2), sulphur replacing oxygen. It is a clear liquid, of very diffusive and offensive odor, and is highly inflammable. As it is a very decided poison, it is not used internally. Externally it has been used as a local anæsthetic, and, as it causes redness of the skin, as a counter-irritant for relief of neuralgia, etc., but its odor prevents its use among patients who are at all fastidious.

Its vapor may be locally used in ear disorders attended by defective secretion of cerumen.]

CARDAMOMUM—CARDAMOM.

[*The fruit of Elettaria Cardamomum, Maton* (*N. O. Zingiberaceæ*).

OFFICINAL PREPARATIONS, U. S.

Extractum Aromaticum Fluidum (Pulv. aromat. 100 gr.; alcohol, q. s. ad 100 cc.). Dose, gr. v–xxx (.30 to 2 Gm.).

Pulvis Aromaticus (Cardamom, Nutmeg, āā 15; Cinnamon and Ginger āā 35 parts). Dose, gr. x–xxx (.65 to 2. Gm.).

Tinctura Cardamomi (15 per cent. dilute alcohol q. s.). Dose, fʒi–ij (4. to 8. Gm.).

Tinctura Cardamomi Composita. Dose, fʒj–iv (4. to 16. Gm.). (Cardamom 2; Cinnamon 2; Caraway, 1; Cochineal ½; Glycerin 6; Dilute alcohol q. s. ad 100 parts.)

This is an agreeable stimulant and flavoring adjunct. It also enters into the Compound Tincture of Gentian, Tinctura Rhei, Tinctura Rhei Dulcis, Vinum Aloes, and Compound Extract of Colocynth.]

[CARUM—CARAWAY.

The fruit of Carum Carvi, Linné (N. O. Umbelliferæ).

OFFICINAL PREPARATION, U. S.

Oleum Cari. Dose, gtt. j–v (.06 to .30 Gm.).

Enters into the Tinctura Cardamomi Co., and the Spts. Juniperus Co.

Caraway is an agreeable aromatic, used as a stomachic, or to prevent the griping of other medicines. The oil is most frequently employed, but an infusion may be made containing ʒij to Oj.]

CARYOPHYLLUS—CLOVES.

[*The unexpanded flowers of Eugenia Caryophyllata, Thunberg (N. O. Myrtaceæ).*

OFFICINAL PREPARATION, U. S.

Oleum Caryophylli. Dose, gtt. ij–vj (.12 to .40 Gm.).

Cloves also enter into Tinctura Lavandulæ Composita, Tinctura Rhei Aromatica, Syrupus Rhei Aromaticus, and Vinum Opii.]

Cloves are a stimulating stomachic, and may be given in substance in doses of gr. v–x (.30 to .65 Gm.).] Cloves, pimento, and oil of cajuput are carminative and perhaps antispasmodic, and may be useful in *flatulent colic*, *hysteria*, etc., more especially as adjuncts to other remedies.

[Clove-tea is a domestic remedy for *dysmenorrhœa* and *colic*. The oil is frequently used to relieve *toothache*, a piece of cotton tinctured with it being placed in the cavity. Spice plasters are sometimes employed to relieve pain, a good formula being: ginger, cloves, cinnamon, and black pepper, in powder, each an ounce; tincture of ginger, half an ounce; honey enough to make a stiff paste.]

CASCARILLA—CASCARILLA.

[*The bark of Croton Eluteria, Bennett (N. O. Euphorbiaceæ).*]

Cascarilla is a light and agreeable tonic, in doses of grs. x–xxx (.65 to 2. Gm.).

[CASSIA FISTULA—PURGING CASSIA.

The fruit of Cassia Fistula (N. O. Leguminosæ, Cæsalpinieæ).

Cassia pulp is laxative in doses of one or two drachms, but is rarely used except in the officinal combination, Confectio Sennæ, which is a favorite remedy against constipation in pregnancy. Dose, ℨj–iv (4. to 16. Gm.).]

[CASTANEA—CASTANEA (CHESTNUT).

The leaves of Castanea Vesca, Linné (N. O. Cupelliferæ), collected in September or October, while still green.

OFFICINAL PREPARATION.

Extractum Castaneæ Fluidum. Dose, fℨj–ij (4. to 8. Gm.).

The leaves contain tannin and other constituents not yet analyzed. The fluid extract has some reputation in the treatment of *whooping-cough*, and might be useful as an astringent in *bowel affections*.]

CATECHU—CATECHU.

[*An extract prepared from the wood of Acacia Catechu, Willdenow (N. O. Leguminosæ, Mimoseæ).*

OFFICINAL PREPARATIONS, U. S.

Tinctura Catechu Composita. (Catechu 12 per ct., cinnamon 8 per ct.) Dose, fʒj–iij (4. to 12. Gm.).

Trochisci Catechu. (One grain each.) Dose, 1 to 5.]

INTERNAL EFFECTS.

Physiological.	*Therapeutical.*
Catechu has powerful astringent properties.	It is a much used drug in the relaxed conditions of various mucous membranes, but more especially in *diarrhœa*, and it constitutes an essential ingredient in the mixtures generally prescribed for the relief of that condition.

℞. Tincturæ catechu	fʒvj;	or	24	Gm.
Pulveris cretæ aromatici [Br.]	ʒij;	"	8	"
Tincturæ opii	fʒij;	"	8	"
Mucilaginis acaciæ	f℥j;	"	32	"
Aquæ cinnamomi	q. s. ad f℥vj;	"	192	"

Misce, fiat mistura, cujus sumat semunciam post singulas dejectiones liquidas.

[CAULOPHYLLUM—CAULOPHYLLUM (BLUE COHOSH).

The rhizome and rootlets of Caulophyllum thalictroides, Michaux (N. O. Berberidaceæ).

Caulophyllum contains saponin and two resins; the so-called *caulophyllin* is a resinous extract prepared from a concentrated tincture by dilution with water. Blue cohosh is used as an emmenagogue and parturifacient; it is also diuretic, and, owing to the saponin which it contains, it should possess value as an expectorant.]

CERA—WAX.

[**Cera Alba.** *Yellow wax bleached.*
Cera Flava. *A peculiar concrete substance prepared by Apis mellifica.*

Wax is a good excipient. It enters into Ceratum (white wax 30, lard 70), and is the basis of the cerates (see below). It also enters into pills, ointments, plasters, and suppositories. It was an ancient remedy for *dysentery*.

Yellow wax is a constituent of Unguentum (lard 80, wax 20), also of Ceratum Resinæ and the compound Cerates.]

[Cerata.

List of CERATES officinal in the U. S. Pharmacopœia:—

Ceratum Camphoræ.
" Cantharidis.
" Cetacei.
" Extracti Cantharidis.
Ceratum Plumbi Subacetatis.
" Resinæ.
" Sabinæ.

[CERII OXALAS—OXALATE OF CERIUM ($Ce_2(C_2O_4)_3 9H_2O$–708).

A white granular powder, insoluble in water or alcohol; odorless and tasteless.]

The oxalate of cerium, in doses of from gr. j to gr. ij, is a popular remedy in the *vomiting of pregnancy*, its mode of action being quite unexplained, and its success being, according to my own experience, greatly exaggerated.

It is generally prescribed in the form of pill.

℞. Cerii oxalatis	gr. xxiv;	or	1.50 Gm.
Extracti gentianæ	gr. xxxvj;	"	2.40 "

Misce, fiant pilulæ duodecim, quarum capiat unam bis in die.

[Disappointment from the use of this drug sometimes results from the presence in the commercial oxalate of cerium of salts of lanthanum, didymium, and other impurities. The chemically pure oxalate of cerium is said to be one of the most efficient remedies against the vomiting of pregnancy that we possess; given in powder, in pill, or suspended in mucilage.] Another reason for disappointment probably is that the usually prescribed dose is much too small. Some good authorities advise us to give ten grains every four hours, one dose being invariably taken before the patient rises from bed. It has also recently been recommended in doses of from 5 to 10 grains as a very efficient remedy for cough [and in smaller doses to children for whooping-cough.]

CETACEUM—SPERMACETI.

[*A peculiar concrete fatty substance obtained from Physeter macrocephalus, Linné (Class Mammalia, Order Cetaceæ).*]

Officinal Preparations, U. S.

Ceratum Cetacei (spermaceti 10, white wax 35, olive oil 55 parts).

Unguentum Aquæ Rosæ. Cold cream (expressed oil of almonds 50, rose water 30, spermaceti and white wax āā 10 parts).

Requires no special notice. [Its internal use has been generally abandoned. The cerate, a perfectly bland preparation, may be used as a dressing to blistered surfaces. The unguentum aquæ rosæ, or cold cream as it is called, is much used for chapped hands and lips, and excoriated places.]

CETRARIA—CETRARIA (ICELAND MOSS).

[*Cetraria Islandica, Acharius (N. O. Lichenes).*

Officinal Preparation, U. S.

Decoctum Cetrariæ (5 per cent.). Dose, f℥ss–iv (16. to 128 Gm.).]

This plant is supposed to have nutritious properties [and formerly enjoyed a great reputation as a demulcent and tonic in *pulmonary affections*].

[CHELIDONIUM—CHELIDONIUM (CELANDINE).

Chelidonium majus (N. O. Papaveraceæ).

Dose, gr x–xl (.65–260 Gm.).

Chelidonium contains two alkaloids, *chelidonine* and *sanguinarine*, combined with chelidonic acid. It is a drastic purgative in doses of 8 to 10 grains of the extract, and has been used in liver disorders attended by jaundice. The juice of the fresh herb is irritating to the skin.]

[Chartæ.

The officinal Papers are Charta Cantharidis, Charta Potassii Nitratis, and Charta Sinapis.]

[CHENOPODIUM — CHENOPODIUM (AMERICAN WORMSEED).

The fruit of Chenopodium Ambrosiodes, Linné, var. Anthelminticum, Gray (N. O. Chenopodiaceæ).

Dose, in substance, gr. xx–xl (1.30 to 2.60 Gm.).

Officinal Preparation.

Oleum Chenopodii. Dose for a child, gtt. v–x (.30 to .60 Gm.).

Internal Effects.

A popular remedy against lumbricoid worms. It may be given night and morning for two or three days, then to be followed by a brisk cathartic.]

[CHIMAPHILA—CHIMAPHILA (PIPSISSEWA).

The leaves of Chimaphila umbellata, Nuttall (N. O. Ericaceæ).

Officinal Preparation, U. S.

Extractum Chimaphilæ Fluidum. Dose, ♏xx–xl (1.30 to 2.60 Gm.).

Wintergreen is an Indian remedy for *scrofula*, *rheumatism*, and *nephritic affections*, and in regular practice it enjoys some reputation as an alterative, and has been recommended as a diuretic in *dropsy*. It is also tonic and astringent.]

[CHINOIDINUM—CHINOIDIN (QUINOIDIN).

A mixture of alkaloids, mostly amorphous, obtained as a by-product in the manufacture of the crystallizable alkaloids from Cinchona.]

[See CINCHONA]

[CHIRATA—CHIRATA.

Ophelia Chirata, Griesbach (N. O. Gentianaceæ).

Extractum Chiratæ Fluidum. Dose, ♏xv–xxx (1. to 2. Gm.).

Tinctura Chiratæ (10 per cent.). Dose, f℥i–ij (4. to 8. Gm.).]

Not much used in this country. (See note under GENTIAN.)

CHLORAL—CHLORAL (C_2HCl_3O,H_2O–165.2).

[*Syn. Hydrate of Chloral. Colorless, transparent crystals, of bitterish caustic taste, freely soluble in alcohol or water.*

TREATMENT OF POISONING.

Strychnine is the physiological antidote for chloral; and the treatment must be conducted on general principles for narcotic poisoning, by evacuants, counter-irritants, stimulants, and maintaining bodily heat.]

LOCAL ACTION.

Physiological.

When applied externally, chloral has been by some authorities supposed to have sedative properties, although the soothing action is preceded by some smarting and irritation; it is also an undoubted antiseptic.

Therapeutical.

It has been recommended as an external application in *neuralgia*, *rheumatism*, and other painful affections, and to check itching in *eczema* and *prurigo*.

Used as a dressing to ulcerated surfaces, it seems to act well by removing the fetor of discharges and lessening pain; and it has been successfully employed, in solution, for the preservation of anatomical preparations, and for the injection of bodies, the only drawback to this being the disagreeable smell which results, and a certain amount of blackening of the tissues on exposure to the air.

Constitutional Actions.

I. *Nervous System.*—1. *Brain.*—Chloral [acts as a sedative to the nervous centres and secondarily to the heart. In small doses it probably] produces an anæmic condition of the brain, and thus causes sleep by imitating the natural anatomical arrangement of that process. The resulting slumber begins very quickly after the dose is swallowed, it is usually sound and dreamless, and the patient wakes in seven or eight hours, well refreshed, and without any marked feelings of *malaise*, or digestive disturbance. Exceptions to this, however, have been observed, and in these chloral has caused preliminary excitement; but it is more than probable that an explanation may be found in the use of the impure specimens of the drug too often retailed. Liebreich believes that chloral exerts its hypnotic influence by undergoing transformation in the blood into chloroform and formic

I. Chloral is an excellent hypnotic, causing sound and refreshing sleep, without the digestive disturbance which usually follows the use of opium. It may be given in simple *insomnia* from mental worry, overwork, or other causes, and it is a remedy of great value in all diseases in which dangerous depression is apt to follow the continuous want of sleep. Thus, in *typhus*, in *delirium tremens*, where it must be pushed boldly in conjunction with an absolute suspension of all alcohol, in *phthisis*, *acute mania*, etc., we may prescribe it with much confidence of success. It has also been recommended in France as an anæsthetic by intravenous injection; from 2 to 4 grammes, thus made to enter the veins, being there supposed to yield chloroform, which then exerts its usual influence. There is no reason, however, to believe that anæsthesia, if thus produced at all which is more than doubtful, is in any de-acid; but this is improbable for the following reasons:—

(*a*) The alkali of the blood is too feeble to liberate the chloroform, and its albumen is considered antagonistic to such a process.

(*b*) No smell of chloroform can be observed in the breath and no anæsthetic effect is produced on the sleeper by moderate doses.

2. *Spinal Cord.*—The reflex irritability of the spinal cord is very decidedly lessened, and the respiratory centre becomes weakened, and eventually paralyzed.

3. *Sympathetic and General Nervous System.*—The vasomotor system is enfeebled, but no special effect seems to be produced on other nervous structures, unless we believe a part of the loss of muscular power, sometimes observed in those who have taken chloral for some time, to be due to an action on the motor nerves.

gree safer than the old mode of inhalation; and as the patient is thus exposed to the additional risks of thrombosis, inflammation of the veins, and the entrance of air, we cannot wonder that this process has found no favor in this country.

2. Chloral is of service in some spasmodic diseases, as *chorea, whooping-cough, asthma, incontinence of urine, labor after-pains*, etc. It is also undoubtedly useful in [*trismus nascentium, puerperal convulsions*, and] cases of *tetanus* even have been thus successfully treated on many occasions; Gubler recording 36, with 21 recoveries, and Chopard publishing 80 successful cases.

If the patient cannot swallow, the drug may be used as enema with milk and yelk of egg. It may also be given as an antidote to strychnine.

3. Chloral, having no influence over sensory nerves, has no power, *per se*, of allaying pain, and is, therefore, useless in that class of cases where opium is of such signal service. It seems, however, to relieve the pain of the early stages of labor before the full dilatation of the os uteri.

II. *Circulatory System.*—Chloral has a powerful action on the heart, lowering and weakening its action by paralyzing its contained sympathetic ganglia. That this effect is not produced through the medium of the vagi is shown by the fact that it comes on even after these nerves are cut, and their terminal cardiac filaments paralyzed by atropine. Along with this slowing of the pulse we get lessened arterial tension from dilatation of the superficial vessels. [Wood[1] considers that chloral reduces the excitability of the cardiac muscle and that it is a *direct depressant of the heart* like chloroform.]

III. *Respiration and Temperature.*—The breathing tends to become slower, and finally to cease, from paralysis of the respiratory centre; but urgent dyspnœa has occasionally been observed, and this has been ascribed to dilatation of the pulmonary vessels, causing an increased afflux of blood to be directed suddenly to the lungs.

The temperature falls, and this is no doubt due to surface evaporation produced by the dilated cutaneous vessels.

IV. *Secreting and Digestive Systems.*—No special in-

II. Chloral, weakening cardiac action, must not be given where we have any reason to suspect an enfeebled state of the heart muscle. This shows how useless chloral is likely to be as a narcotic, when flaccid vessels allow free gravitation of blood to the brain during the recumbent posture, thus congesting its tissues, and effectually preventing sleep. Its action is most manifest when the circulation is strong and the arteries tight.

III. This effect on the respiratory centre naturally suggests caution in prescribing chloral in cases of advanced *bronchitis* with rapidly accumulating mucous secretion and deficient oxygenation of the blood. It has been much used in whooping-cough, but I have been unable to trace any special therapeutic effect beyond that to be ascribed to the soothing influence of sleep.

It has been highly recommended as an efficient remedy for sea-sickness.

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[1] [Therapeutics and Materia Medica, 7th ed., Philada., 1888, p. 182.]

fluence is produced on any of these, but occasionally vomiting and purging have followed the use of chloral.

ABSORPTION AND MODE OF ELIMINATION.

Chloral is rapidly absorbed by the blood, and given out probably by the urine, the breath, and perhaps the skin.

Poisonous Effects.

Chloral may kill by cardiac syncope, and, as this effect has been known to follow a single dose of 30 grains, considerable caution must be exercised in its use, the very uncertainty of its action warning us always to feel our way with great care. Cases of recovery have been recorded after quantities of 320 and 165 grains respectively, but on the other hand sudden death has occasionally followed a very moderate dose; or again, death may ensue from paralysis of the respiratory centre, with coma and gradual suffocation; and, finally, a series of cases has been recorded in which symptoms arose akin to blood poisoning, with purpuric and scorbutic eruptions, ulceration of gums, and great prostration, ending in death.

Antidotes.

Here our efforts must first be directed to obviating the tendency to death. We must endeavor to restore the heart's action by warmth, stimulants, strong coffee, and promote breathing by irritation of the surface, galvanism, and artificial respiration; counteract the rapidly lowering temperature, on which so much danger depends, by warmth; and finally employ physiological antidotes, such as atropine and strychnine. One case is recorded in which alarming symptoms, caused by taking 370 grains, speedily yielded to two subcutaneous injections of strychnine.

CAUTIONS, MODE OF ADMINISTRATION, DOSE, ETC.

[It is recommended that re-crystallized chloral only should be prescribed, as the commercial article is liable to be contaminated with impurities and the results of decomposition.] Liebreich holds that many of the commonly described bad effects of chloral are due to impure preparations, which are unfortunately only too effectually masked by the syrups now in such general use. It is easy to detect impurity of the crystals, which should not be acicular in form, and cake chloral should always be distrusted.

The use of chloral requires caution, as many instances of death from its employment are on record, and other cases have been noted in which very serious symptoms followed doses varying from 10 to 50 grains. We must also be mindful of other physiological peculiarities. Thus great muscular prostration, more especially affecting the legs, and causing staggering, not very unfrequently follows its continued use.

Persons vary, however, in a very remarkable manner with regard to their susceptibility to the action of chloral, alcoholism lessening this in marked degree. Mr. Hulke (*Clin. Soc. Trans.* 1875) records a case in which a young lady, æt. 23, took in one dose 320 grains, causing lividity, failure of respiration, weakened action of the heart, and contraction of the pupils, from which she was recovered with difficulty by the stomach-pump, artificial respiration, and strong coffee. Mr. Bishop, of Boston, had a case in which a patient, suffering from delirium tremens, took 165 grains, followed by thirty-six hours' profound sleep, and a perfect cure on waking.

Prof. Gairdner met with a case of chorea in a little girl of eight, where 45 grains were taken by mistake, with perilous immediate consequences, but entire removal of the disease. It is believed, on somewhat vague evidence, that chloral-eating is practised on a large scale with resulting cerebral anæmia, and moral and muscular weakness. The best-marked case I have yet met with is published by Mr. Tuflis, of the Edinburgh Asylum (*Edin. Med. Journ.* 1877), where 180 grains were regularly taken every day in frequent doses, causing dyspepsia, moral perversion, muscular weakness, a feeble heart, loss of memory, and epileptiform fits, speedily removed by withdrawal of the drug.

Various skin eruptions, usually confined to the face, beginning as spots of roseola, coalescing to form patches of erythema, occasionally generally diffused purpuric patches, and the very peculiar deep flushing of the face following the use of stimulants, and due no doubt to vaso-motor paralysis, have been carefully described by Dr. Crichton Browne and other observers.

There seems no doubt that chloral acts more powerfully in persons whose blood is strongly alkaline, and Prof. König found that the previous administration of sodium bicarbonate heightens the narcotic effect. In this way is explained the great susceptibility to the action of chloral noted by Dr. Russell, of Glasgow, in typhus fever. Liebreich believes it to act unfavorably in acute rheumatism, on account of the acid state of the blood. He recommends us never to give it on an empty stomach, nor to combine it with milk.

Considering the undoubted fact that not only dangerous symptoms, but even death, have followed a dose of 30 grains and even of 10 grains, we must begin, as a rule, with 20 grains or a smaller quantity, to be repeated as occasion requires. In labor, give one dose of gr. xv, repeated, if necessary, in two hours. We must remember, however, that the narcotic action of chloral is not invariably exhausted in the single sleep to which it originally gives rise, but it may be held over until next night, so that our best practice will be to give a full dose only once in the forty-eight hours. The taste and smell of chloral being pungent and disagreeable, we must endeavor to render our prescription as palatable as we can. The syrup contains 10 grains to the drachm. Or we may use the following formula:—

℞.	Chloralis	gr. xx;	or	1	30 Gm.
	Syrupi aurantii	fʒj;	"	4	"
	Aq. menth. pip. q. s. ad	f℥j;	"	64	"

Fiat haustus horâ somni sumendus.

[The addition of gr. v of chloral to a small dose of morphine greatly adds to its hypnotic effect, and prevents unpleasant results that sometimes are produced by morphine alone.] As a preservative fluid for anatomical purposes we may use gr. v ad f℥j; as a dressing for wounds, ulcers, and sore nipples, etc., gr. xv ad f℥j; in eczema, gr. lx to an ounce of lard.

[**Chloral-Camphor.** By rubbing together gum camphor and chloral, a fluid is produced resembling simple syrup. This has been recommended as a local anæsthetic in *neuralgia*, applied with a brush to the external skin. It is rubefacient, but not vesicating. By the addition of this to unguentum an application may be conveniently and very efficiently made for *prurigo* (Bulkeley).]

Chloral-Butylicum; (or Croton-Butyl-Chloral Hydrate.) This is a hydrate of trichorbutylaldehyd made by the action of chlorine upon acetic aldehyde and distillation. It is not officinal. The name of Butyl Chloral, advised by Liebreich, would be an improvement, as preventing the idea of any relationship to croton oil. Dose, gr. iij to x (.20 to .60 Gm.)

Local Action.

None has been described.

Constitutional Action.

Physiological.	*Therapeutical.*
I. *Nervous System.*—1. *Brain.*—Butyl-chloral causes sleep in from fifteen to twenty minutes. [It is better to administer it in glycerine and water, than in alcohol.]	1. Butyl-chloral has been highly praised by its discoverer, Liebreich, as a narcotic, being given by him in doses of from 15 to 30 grains (1. to 2. Gm.). There is little English experience to quote on this heading, as the doses used here are far too small to produce sleep.
2. *Spinal Cord.*—No action is produced on the spinal cord, nor consequent muscular relaxation. Some paralyzing influence is eventually excited on the medulla.	
3. *Sympathetic and other Nervous Systems.*—No influence seems to be exerted on the vaso-motor nerves, but on the fifth a well-marked sedative effect is noted, indicated by anæsthesia of the head and face, loss of irritability of the eyeball, and failure of the nerve-trunk itself to respond to galvanic stimulation.	3. The anæsthetic influence of butyl-chloral would naturally suggest its use in *facial neuralgia*, and a good deal of success has been thus obtained in dealing with this troublesome affection, doses of from 2 to 6 grains having generally been prescribed.
II. *Circulation.* — Butyl-chloral has physiologically less tendency than chloral-	II. Experience has shown it to be an uncertain remedy, and dangerous and even fatal

hydrate to weaken or lower the action of the heart.

III. *Respiration and Temperature.* — Butyl-chloral tends to lower the rate of breathing, and eventually kills by paralyzing the respiratory centre.

symptoms have followed ordinary doses in organic heart disease.

[III. Butyl-chloral closely resembles chloral hydrate in its action upon the system, except in possessing greater danger. For this cause its use has been almost entirely discontinued in this country.]

[CHLOROFORMUM VENALE—COMMERCIAL CHLOROFORM ($CHCl_3$—119.2).

A liquid containing at least 98 *per cent. of Chloroform.*]

[CHLOROFORMUM PURIFICATUM (PURIFIED CHLOROFORM).

(*A heavy, clear, colorless, diffusive liquid of a characteristic, pleasant, ethereal odor, a burning, sweet taste, and a neutral reaction.*)

Dose, ♏x–xxx (.65 to 1.30 Gm.) largely diluted.

OFFICINAL PREPARATIONS, U. S.

Mistura Chloroformi (chloroform 8, camphor 2, fresh yelk of egg 10, and water 80). Dose, f℥ss (16. Gm.).

Spiritus Chloroformi[1] (10 per cent.). Dose, fʒss-j (2. to 4. Gm.).

Linimentum Chloroformi (commercial chloroform, 40; soap liniment, 60). External use.

It is used in the manufacture of Liquor Gutta-Perchæ, and in preparing Atropine.

POISONING.

If, during chloroform-narcosis, there is failure of the circulation, vigorous and prompt measures are called for. Nitrite of amyl should be administered (gtt. iij–v) by inhalation. The surface of the chest should be smartly slapped with the fringe of a towel dipped in ice-water, a piece of ice may be introduced into the rectum, the head must be lowered and the legs elevated, and ammonia held to the nose; an assistant meanwhile practising artificial respiration. This treatment the late Prof. Gross claimed to be invariably effective, as by resorting to it he had not lost a patient out of more than 5000 cases of chloroform-anæsthesia.]

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[1] [Spiritus Chloroformi, Br., contains one part in twenty.]

LOCAL ACTION.

Physiological.	*Therapeutical.*
Chloroform, when allowed to remain for some time in contact with the skin, acts as an irritant, causing redness and smarting, followed by vesication. It has also, however, some sedative properties. Chloroform is an excellent solvent of caoutchouc, gutta-percha, and many fats and resins.	The locally sedative action of chloroform has led to its extensive use as an application for the relief of *rheumatic* or *neuralgic* pains, the liniment being a convenient form. It is also a useful remedy for allaying the itching of some chronic forms of *skin disease*. Gutta-percha dissolved in chloroform to saturation is an excellent application in *small-pox* and *erysipelas*.

CONSTITUTIONAL ACTION.

Chloroform, when taken internally, may act as a stimulant, sedative, and anti-spasmodic.	It is a useful remedy in *hysteria*, *asthma*, and *nervous palpitation*, for the arrest of *sea-sickness* and other forms of vomiting, and for the soothing and quieting of some forms of *irritable cough*.

COMBINED LOCAL AND CONSTITUTIONAL EFFECT.

Under this heading it may be convenient to discuss the anæsthetic properties of chloroform, and this we will now proceed to do on the plan adopted generally throughout these pages.

Physiological.

1. *On Brain and Nervous System.* — Chloroform has first a stimulating, and secondly a sedative, action on the brain, a good deal of excitement and struggling taking place during the early stages of inhalation, whilst, during the later, narcosis is complete, and the patient lies quiet and motionless. This condition resembles natural sleep in being associated with anæmia of the brain, but differs by its rendering the patient quite insensible to external impressions, including the most severe cutting operations, this effect being due to a paralyzing influence of the drug on the ganglionic centres of the sensory nerves.

The reflex functions of the cord are also lulled to slumber, and, if the inhalation is pushed too far, paralysis of the respiratory centre may ensue. Its inhalation under certain circumstances is apt to excite erotic sensations in women, and to lead them to bring unfounded accusations against medical men.

2. *Heart and Circulation.* —On the heart the influence of chloroform is at first slightly stimulating, the pulse becoming quickened; but secondary depression follows from a paralyzing influence on the sympathetic ganglia,

Therapeutical.

1. In the early stage of inhalation the patient usually feels confused and giddy, his eyes are suffused, his face congested, and the heart beats rapidly. This is often followed by apparent insensibility, from which, however, he can readily be roused, and very frequently a stage of violent excitement ensues, during which he struggles violently and with remarkable muscular force, talking and singing incoherently meanwhile. This stage has been compared with that of alcoholic intoxication. Succeeding to this we have that of "anæsthesia," in which he is profoundly insensible, with contracted pupils; and finally we reach that of "narcosis," in which the face becomes congested, the pupils dilate, and stertorous breathing sets in. Chloroform inhalation is only used during its first stage to alleviate the pain of childbirth, it being found that full anæsthesia under these circumstances is apt to relax the uterine muscular tissues, and not only to check their contraction, but to predispose to future hemorrhage.

During the second stage, chloroform is used for the purpose of obtaining full and complete insensibility to pain during the performance of the pulse now growing slower, and the arterial tension becoming lowered.

3. *Respiration and Temperature.* — The respiration tends at first towards increased rapidity, but if the inhalation is pushed so far as to affect the respiratory centre, the breathing grows slower and finally ceases. [It may cease suddenly without warning; and there is no means of determining previously, at least with our present knowledge, when this accident will occur, or what patients are particularly liable to it. This is the great objection to chloroform.] We usually observe some tendency to perspiration attending chloroform inhalation, and a consequent slight reduction of temperature.

4. On the *digestive and secreting organs* chloroform seems to exert no marked influence, the sickness so frequently observed during recovery being purely reflex in character.

operations; and this invaluable property has deprived the practice of surgery of much of its former horrors.

We also employ it freely to relax muscular tension and spasms, and so facilitate the reduction of *hernia* and *dislocation ;* for diagnostic purposes, in order to dispel phantom uterine tumors, as well as to enable us to make a careful examination of extremely painful parts.

It is also of service for the relief of various forms of spasmodic affections, as *whooping-cough*, *infantile* and *puerperal convulsions*, *chorea ;* and to alleviate pain, in *cancer*, during the passage of *renal* or *biliary calculi*, and under many other conditions.

POISONOUS PROPERTIES.

Chloroform may kill in two ways. (1) By primarily paralyzing the heart, and this has generally been considered to be due to the inhalation of air too highly charged with chloroform vapor, Mr. Clover holding that over 5 per

During chloroform-inhalations we must watch the pulse, and specially note enfeeblement, irregularity, or cessation of its beats. Sudden pallor of the face, lividity and gasping for breath are signs of ill omen. If the cent. must be considered dangerous. Dr. Brunton, however, explains very ingeniously how it is that small doses are more apt to produce this effect than large, and why it is that deaths generally occur during imperfect narcosis. He points out that under these conditions the reflex contraction of the vessels is destroyed, whilst the heart is stopped or slowed, so that the irritation of a sensory nerve may produce syncope by stopping the supply of blood from the heart, while the blood still flows rapidly from the arterial system through the capillaries into the veins.[1] When the anæsthesia is complete, both reflexes are paralyzed and circulation remains unaffected by any impression made upon the sensory nerves.

It seems highly probable, however, that, in accordance with the views of Syme, Lister, Chiene, etc., fatal accidents from chloroform are not so liable to proceed from the heart as (2) from the respiratory function; and this mode of fatal accident has been again subdivided into two headings: 1st. Death by apnœa, or stoppage of the breathing from nervous influence or mechanical causes;

action of the heart seems to fail, we must administer stimulants by the mouth or rectum, and excite the cutaneous surface. Galvanism seems more likely to exhaust than excite the contractility of the heart muscle; and galvano-puncture, so much vaunted by foreign observers, has not been tried in this country.

Chloroform accidents depending, in a great majority of cases, on failure of respiration, we must endeavor to re-excite this function by cold sprinkling, or ammonia vapor, but, most hopefully, by the steady and persevering use of artificial respiration. Always, however, see that no mechanical hindrance to breathing exists, and more especially take care to draw the tongue well forward;

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[1] [If this were true, there should be more deaths from heart-failure under ether than chloroform, because ether is more irritating to the upper air-passages than chloroform.]

or, 2dly, by suffocation, from excessive formation of carbonic acid in the blood. Of these, the first is by far the more common, and is often caused by falling back of the tongue, or by paralysis of the intrinsic muscles of the larynx, closing the glottis. It therefore follows that, whilst engaged in the administration of chloroform, the breathing must be very carefully watched. [The density of chloroform vapor being much greater than atmospheric air, if given freely and without proper dilution, it may cause suffocation directly, by filling the air-cells and excluding oxygen, owing to the difficulty of diffusion of such a heavy vapor. This may explain the utility of Nélaton's method, which has been followed by such successful results in threatened death from chloroform.[1]] this little operation acting not only by removing its own mechanical impediment to breathing, but by drawing and pulling the epiglottis forward, and thus opening the glottis by the traction made on the aryteno-epiglottidean muscles.

The same object may be attained by raising the chin and drawing it forcibly away from the spine.

Galvanic stimulation of the phrenic nerve has been recommended, and several apparently hopeless cases have been saved by the process of inversion as originally proposed by Nélaton.

The inhalation of nitrite of amyl has also been recommended as averting the asphyxia of pulmonary stasis, and tracheotomy has been successful in some apparently hopeless cases.

ABSORPTION AND ELIMINATION.

Chloroform is rapidly absorbed and rapidly given off by the breath and urine, in which secretion it can be readily detected.

MODE OF ADMINISTRATION.

Fatal accidents from chloroform have become so alarmingly frequent of late—the total number, according to Bartholow, amounting to 500—that some surgeons even consider its use unjustifiable; but it is on the whole the best anæsthetic, and, by adopting the following precautions, we may hope to imitate the success of the Edinburgh School, where danger or inconvenience rarely occurs, Mr. Syme having met with no death during 8000 administrations. [Prof. Fraser, of Edinburgh, advises the subcutaneous injection, fifteen or twenty minutes before chloroform is begun, of $\frac{1}{120}$ to $\frac{1}{60}$ gr. of atropine combined with gr. $\frac{1}{12}$ to gr. $\frac{1}{8}$ of hydrochlorate of morphine, with the object of stimulating the heart, obviating nervousness, and lessening or altogether preventing subsequent sickness.]

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[1] [See paper on the Physics of Anæsthetics, by Dr. Wm. H. Greene, in the *Am. Journ. of Med. Sci.* for April, 1882.]

1. Never permit inhalation to take place in a sitting posture, and see that the patient's neck is free from all constriction.

2. Give strict orders that no solid meal be taken for at least two or three hours previously [solid food should not be eaten for at least twelve hours, as a safe precaution], but a little beef-tea may be allowed, and a small sip of brandy is useful just before the operation. The sickness which so frequently attends a loaded stomach is not only inconvenient, but has proved fatal by suffocation from the drawing of vomited matters into the air-passages. And, in addition to this danger, vomiting is attended with special risks after such operations as ovariotomy and cataract extraction, and after the first of these it occasionally continues with exhausting pertinacity.

3. Use no special form of inhaler, but pour the chloroform upon a towel or other porous material, and give it with care [allowing free admixture of the vapor with sufficient atmospheric air]. Tell the patient to close his eyes and to inspire deeply, and when the period of excitement comes on do not suspend the inhalation. Complete anæsthesia is proved by the abolition of reflex action, as shown by insensibility of the eye when the cornea is lightly touched with the finger, by muscular relaxation, and by insensibility to pain.

[4. If the action of the heart seems to fail, remove the chloroform and administer ether vapor for a few respirations. Do not give anything by the mouth. If the respiration be languid and intermit, assist the movements by gentle pressure on the chest and abdomen. If the natural respiration has ceased and the pulse is not distinctly felt, at once resort to the more effective artificial respiration of Marshall Hall or Howard. Warmth should also be applied by the readiest means; galvanism, etc. C.]

When the operation is over, let the patient recover naturally, and do not disturb his sleep by the purposeless towel flickings so frequently to be seen in operating theatres. But the patient should be carefully watched for at least an hour after administration.

As regards the quantity of chloroform to be used for each inhalation, it is impossible to lay down any rule, for the inconveniences occasionally met with seem to bear no sort of proportion to the dose of the anæsthetic. [A couple of drachms may be poured from a dropping bottle upon the towel, and a few drops added from time to time to replace loss by evaporation. The chloroform should never be trusted to any but a skilled assistant.] If the chloroform be of good quality, it is safer, as shown by Brunton, to give it freely,[1] and it is better to trust to our own care and skill than to the fancied safety of inhalers. It can never be possible to deprive an unnatural condition like profound anæsthesia of all dangers, and even the theoretically safe instrument of Clover, with its guaranteed 3 per cent. of chloroform vapor, has been shown to be not absolutely free from risks.[2]

It would be very satisfactory could we lay down any laws for our guidance in anticipating danger from chloroform inhalation in any special class of cases, but this unfortunately we cannot do. It is now well known that neither organic disease of the heart nor conditions of extreme debility are contra-indications; and although fatty heart is frequently discovered *post mortem*, we cannot absolutely state that this is not a mere coincidence, nor can we pretend to diagnosticate such degeneration with any certainty during life. Some authorities believe that chloroform is more dangerous to the old than the middle-aged or young, and there seems no doubt that habitual topers are brought under its influence with considerable difficulty.

It may be very pleasantly combined with cardamom, in doses of from ♏x to ʒj; or we may make a good emulsion with 20 minims in ℥j of milk. The P. Br. has now introduced the tinctura chloroformi et morphinæ, a very complex preparation, containing, in addition to the principal ingredients, ether, prussic acid, peppermint, treacle, liquorice and syrup [chlorodyne]. Dose, 5 to 10 minims.

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[1] [Surely Brunton's views hardly warrant so much indifference to the dose of chloroform. The tendency to syncope is found to be in proportion to the strength of the vapor, whenever, by opening the windpipe, we make sure of its entrance into the lungs. Ten per cent. of chloroform vapor, given in this way, is rapidly fatal by arresting the heart's movement. The reason why chloroform has often been fatal in minor operations is, that it so often happens an extra dose is given that it may last long enough without further attention from the surgeon. C.]

[2] [I am not acquainted with any case in which so little as 3 per cent. has been fatal to the human subject. C.]

Chloroform is most generally given internally under the form of the spiritus chloroformi, or chloric ether, or as mistura chloroformi. [For the remarks of Mr. Clover upon the choice of anæsthetics, see page 59.]

[CHONDRUS—CHONDRUS (IRISH MOSS).

Chondrus crispus, Lyngbye, and Chondrus mammillosus, Greville (N. O. Algæ), bleached and dried by exposure to the sun.

Carrageen is demulcent and nutritive, and is used in decoction (℥ss to Oiij) flavored with lemon, as a *tisane* or drink for the sick. Boiled with milk it makes carrageen blanc mange, an acceptable and nourishing article of diet for an invalid.]

CHRYSAROBINUM—CHRYSAROBIN.

[*A mixture of proximate principles, commonly misnamed Chrysophanic Acid, extracted from Goa-Powder, a substance found deposited in the wood of the trunk of Andira Araroba, Aguiar (N. O. Leguminosæ, Papilionaceæ).*

OFFICINAL PREPARATION.

Unguentum Chrysarobini (10 per ct., with benzoinated lard 90 per ct.). External use.]

Goa-Powder has been extensively used in cases of *ringworm* and *psoriasis.*

There is no doubt, as I have amply verified by my own experience, that chrysarobin, although not the infallible specific it was originally supposed to be, is a very useful remedy in psoriasis, and the various forms of tinea. Its drawbacks are—

1st. The irritation it often excites. This may either be in the form of a papular eruption, or of an inflammatory condition closely allied to erysipelas, frequently spreading over the head and face, and attended by most distressing smarting and tingling.

2d. The peculiar purplish discoloration of the skin which it causes, and which is only removed by the desquamation of the cuticle which usually follows.

3d. The way in which it stains linen—the discoloration, however, disappearing after the use of bleaching-powder.

CIMICIFUGA—CIMICIFUGA (BLACK SNAKE-ROOT).

[*The rhizome and rootlets of Cimicifuga racemosa, Elliott* (*N. O. Ranunculaceæ.*)

OFFICINAL PREPARATIONS, U. S.

Extractum Cimicifugæ Fluidum. Dose, fʒss–j (2. to 4 Gm.).

Tinctura Cimicifugæ (20 per ct.). Dose, fʒj–iij (4. to 12. Gm.).

The decoction, although not officinal, has been used to a considerable extent, and with benefit, in the treatment of *chorea* in children. It is sedative and antispasmodic, and in large doses vomits.]

This drug was introduced into practice in this country [England] some years ago by Sir J. Simpson, who praised it highly in *chronic rheumatism*, *lumbago*, and *hypochondriacal depression*. It has been found useful in America as an *emmenagogue*, but has never taken any real hold upon professional attention at home.

CINCHONA—CINCHONA.

[*The bark of any species of Cinchona* (*N. O. Rubiaceæ, Cinchoneæ*) *containing at least three per cent. of its peculiar alkaloids.*

OFFICINAL PREPARATION.

Infusum Cinchonæ (of yellow cinchona, except when some other variety is specified, 6 parts, aromatic sulphuric acid 1 part, water a sufficient quantity to make 100 parts). Dose, f℥j–ij (.32 to .64 Gm.).]

CINCHONA FLAVA—YELLOW CINCHONA.

[*The bark of the trunk of Cinchona Calisaya (Weddell), containing at least 2 per cent. of quinine.*]

CINCHONA RUBRA—RED CINCHONA.

[*The bark of the trunk of Cinchona Succirubra (Pavon), containing at least 2 per cent. of quinine.*

OFFICINAL PREPARATIONS, U. S.

Of the Yellow Bark:—

Extractum Cinchonæ. Dose, gr. v–xv (.30 to 1. Gm.).

Extractum Cinchonæ Fluidum. Dose, gtt. v-xxx (.30 to 2. Gm.).

Infusum Cinchonæ (except when otherwise specified). Dose, f℥ij (64 Gm.).

Tinctura Cinchonæ (20 per cent.). Dose, fʒj–ij (4. to 8. Gm.).

Of the Red Bark:—

Tinctura Cinchonæ Composita (Cinchona, Glycerin, āā 10; Bitter Orange Peel, 8; Serpentaria, 2; Alcohol to 100 (Huxham's tincture). Dose, fʒj–ij (4. to 8. Gm.).

The officinal Alkaloids and Alkaloidal Salts of Cinchona are as follows:

Cinchonidinæ Sulphas (white silky needles soluble in 100 parts of water, and 71 parts of alcohol; odorless, with very bitter taste). Dose, gr. v–xxx (.30 to 2. Gm.).

Cinchonina (white crystals, almost insoluble in water, at first tasteless and then bitter, has an alkaline reaction). Dose, gr. v–xxx (.30 to 2. Gm.).

Cinchoninæ Sulphas (white needles, soluble in 70 parts of water, and in 8 parts of alcohol; very bitter taste). Dose, gr. v–xxx (.30 to 2. Gm.).

Quinidinæ Sulphas (white needles, soluble in 100 parts of water, and in 8 parts of alcohol; very bitter taste). Dose, gr. v–xxx (.30 to 2. Gm.).

Quinina (a white amorphous powder, soluble in 1600 parts of water, and in 6 parts of alcohol; very bitter). Dose, grs. i–ʒj (.06 to 4. Gm.).

Quininæ Bisulphas. Dose, grs. i–lx (.06 to 4. Gm.).
" **Hydrobromas.** " " " " "
" **Hydrochloras.** " " " " "
" **Sulphas.** " " " " "
" **Valerianas.** Dose, grs. i to xx (.06 to 1.30 Gm.).

Chinoidinum (a mixture of alkaloids mostly amorphous, obtained as a by-product in the manufacture of the crystallizable salts). Dose, gr. ij–xx (.12 to 30. Gm.).]

EFFECTS AND USES.

In any comparative estimate of the absolute importance of various drugs to the human species, cinchona would probably take the second place, the first being, by universal consent, accorded to opium. The bark itself, however, is not now of so much importance as in former years, when it was our sole dependable remedy for the poison of ague, and was then given in such enormous quantities as to be very embarrassing to the weak stomachs of feverish patients. This difficulty is now happily removed, and much greater precision and efficiency given to our treatment, by the introduction of quinine, the discovery of which in 1820 inaugurated a true era in therapeutics.

The preparations of cinchona are now used almost exclusively on account of their tonic properties, and in many cases of general debility, want of appetite, and loss of tone, most gratifying results are obtained by their employment either singly or in combination. Quinine itself, however, has a higher and wider therapeutic range, and has in recent years obtained so much of the careful attention of physiologists that we are bound to consider its properties with as much care and precision as the present state of science allows.

LOCAL ACTION.

Quinine is occasionally, although rarely, used as a local application; but the theory of this is so intimately bound up with its internal use, that we need not refer specially to it at present, save to note that an injection of gr. ij ad ℥j has been found of great service in checking the unhealthy secretion of an irritable bladder. [It is antiseptic.]

INTERNAL ACTION.

Physiological.

I. *Nervous System.* — 1. *Brain.*—Quinine in large doses causes curious brain symptoms, such as partial blindness, well-marked deafness and ringing in the ears, giddiness, and frontal headache, associated with a peculiarly dull, heavy expression of countenance. Binz has suggested that some at least of these phenomena may be due to partial anæmia of the brain, caused by enfeebled action of the heart. Hammond, on the contrary, asserts that quinine causes congestion of the brain. Gubler asserts that it stimulates the great sympathetic and auditory nerves.

It contracts the uterus.

2. *Spinal System.*—In frogs, quinine acts powerfully in reducing the reflex irritability of the cord, the animal lying motionless, quite insensible to external impressions, the stillness being only broken by occasional tetanic spasms; but this action is contradicted by the more recent experiments of Binz.

II. *On Vascular System.*—Moderate doses of quinine increase the frequency of the

Therapeutical.

I. The subcutaneous injection of quinine has been highly recommended by Surgeon-Major Hall in sunstroke.

This mode of administering the drug, however, is not unfrequently followed by inflammation and even abscess at the seat of puncture. Gubler prefers the bromhydrate to the sulphate, as being less irritating and better adapted for use in this way.[1]

The oxytocic action of quinine must be, in part at least, due to its action on the nervous system; but its undoubted power in contracting the uterus has not yet been much used in medicine. [It appears to be appreciated in the United States. Here it is frequently used as a parturifacient in single doses of gr. x–xv.] It has, however, been asserted that it may be injurious to the fœtus.

II. Quinine has therefore some stimulating properties. It has been shown to be a

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[[1] A hypodermic injection of sulphate of quinine has caused tetanus. Possibly, an unclean syringe was responsible, as it is for abscesses after hypodermic injection.]

pulse, but, if larger quantities be given, the rate of pulsation falls, the arterial tension diminishes, and death may even ensue from convulsions or sudden collapse following depression of the heart's action.

Quinine has a direct action on the white corpuscles of the blood, checking their amœboid movements, and arresting their tendency to migrate through the walls of the capillaries under inflammatory conditions.

It also prevents, in some degree, the due giving up of oxygen by the red corpuscles, and may thus interfere with the oxygenation of the tissues.

III. *Respiration and Temperature.*—No influence on the respiratory function has been observed. On the temperature of a person in full health but little lowering effect is produced; when fever is present, however, the temperature may be brought down by giving large doses. Opinions differ so much as to the explanation of this effect, that it is impossible to speak with any confidence on the question. [According to Henbach, the cause of death in animals poisoned with quinine is a paralytic arrest of respiration.]

valuable remedy in 8 to 15 grain doses, in combination with potassium iodide in cases of specific and non-specific serpiginous and phagedenic ulceration, after the failure of other remedies. Very large doses seem to be well borne in pyrexial conditions.

An essential part of inflammation and suppuration is now known to be extrusion of the white blood corpuscles from the capillaries, and their subsequent transformation into pus-cells. Quinine may therefore be of great service in localized inflammations, and in checking exhausting discharges from abscesses or wounds, and in pyæmia good results have followed its use.

III. The antipyretic properties of quinine are much prized in Germany, and it is there largely used in the treatment of *typhus*, *typhoid*, *acute rheumatism*, and *pneumonia*.

Immense doses, even reaching 75 grains, have been given, and it is observed that tolerance of the drug is undoubtedly present in fever, and that very much larger quantities can be taken than in a state of health. It is only when very freely given, however, that it has any cooling influence; and we are advised to prescribe from 25 to 45 grains in divided doses within the first half hour, and then allow an intermission of from 24 to 48 hours, as the effect would be diminished by spreading it over a longer time, on account of its rapid elimination. On account of this rapid elimination Liebermeister considered it even a more valuable antipyretic than the cold bath.

In this country we do not make very extensive use of quinine in febrile disorders, for the resulting diminution of temperature is only temporary, and has no influence on the progress of the disease. When a really dangerous degree of pyrexia is reached, we know that we can hold it readily in check by cold baths.

A committee of the Clinical Society reported (vol. iii.) on the antipyretic action of quinine, finding that large doses reduce temperature in pyrexia when given towards the end of the exacerbation or during the remission. It seems, however, to have no influence in shortening the duration of a specific disease. They advise a single large dose, followed by an intermission of from 24 to 48 hours. Ringing in the ears was occasionally observed, but other physiological results were extremely rare. Dr. Clifford Allbutt finds quinine of use in septic fevers, such as pyæmia, septic absorption, ery-

IV. *On Secretion.* — In moderate doses, quinine increases the secretion of saliva, and augments, like most bitters, the flow of gastric juice, stimulating the appetite at the same time.

If larger quantities, however, are taken, an exactly opposite effect is produced; hunger is blunted, and the alkaloid, acting as an irritant to the mucous membrane of the stomach, checks the gastric juice. The urine is found to be unaltered in quantity, but the amount of uric acid and probably of urea given off is decidedly diminished.

V. Quinine is an excellent antiseptic, preventing and arresting decomposition. This it does in virtue of its poisonous influence over minute organisms, for we know that the process of decay is caused by the formation and rapid multiplication, within the putrefying fluid, of microscopic bodies called microzymes. Quinine in small doses paralyzes, and in larger, destroys, these creatures, and so at once arrests further destructive action.

sipelas, peritonitis, &c., reducing the oscillations of temperature, but not relieving the general conditions. Dose from 20 to 60 gr. daily. He holds it to be not only useless, but possibly injurious in typhoid.

IV. Quinine is the best tonic we possess, increasing the appetite, and bracing up the intestinal mucous membrane. It is given, therefore, in all states of the system where debility is present, in simple loss of appetite, in some forms of *dyspepsia*, in *neuralgia*, especially of the supra-orbital nerve, in convalescence from acute disease, to arrest the *nocturnal sweating* of phthisis, etc.

V. In virtue of this poisonous influence over protoplasm and minute germs, it has been recommended in large doses in *whooping-cough*, on the ground of destroying the vitality of the thick and tenacious mucus which causes so much irritation in the bronchial tubes, or, as others hold, by destroying the minute fungus on which the disease depends. [Henke.] During the later stages of the disease much benefit is derived from this treatment. Again, in

Some authorities have been inclined to explain its remarkable influence over ague by theoretically supposing that the essence of the malarial poison really consists in a minute germ or vegetable cell derived from the marshy land where the pestilence breeds, and that the antiseptic property of the drug is here the true explanation of its therapeutic success.

This seems to be borne out by the recent observations of Lanzi and Zerner, who have found an identical fungus in the decaying vegetation of the Roman Campana and in the tissues of the victims to malaria.

hay-fever, which is now proved to result from the local action on the Schneiderian mucous membrane of the pollen of particular grasses, Prof. Helmholtz has lately pointed out that quinine applied in the form of snuff or weak solution [gr. j–f℥j], will effect a speedy cure.

SPECIFIC ACTION.

Quinine has what, for want of a better explanation, we must call a specific control over all malarial fevers and diseases which display any periodical tendency. Gubler, however, denies all specific influence, and believes that it acts by giving tone to the sympathetic nerve, thus enabling it to resist the attack of the malarial poison. Binz, on the contrary, denies all neurotic explanations and holds its effects to be due to its paralyzing action on the septic processes caused in the blood and tissues by a ferment from decaying vegetation, whose further chemical development is thus arrested.

Quinine may act as a prophylactic, and, given in moderate doses at regular intervals, may ward off attacks; and this fact is extensively taken advantage of by African travellers and troops stationed in malarial districts, to whom rations of quinine are invariably served out. When the disease, however, is fairly developed, quinine will keep it in check and even arrest its progress; and this either in smaller doses frequently repeated, or in one considerable dose taken shortly before the attack is expected.

The periodical return of the paroxysms of shivering, heat, and sweating, enables us to calculate with accuracy the very hour of the day at which to expect their recurrence; and experience has determined that the best mode of treatment is to give one full dose of 10 or 20 grains four or five hours before the attack comes on.

The remarkable enlargement of the spleen which attends intermittent fever is often so rapidly diminished by quinine as to make it probable that the reduction of bulk is due to an active contraction of the substance of the organ itself.

Another curious point about the action of quinine is, that whilst it may check the rigors and rise of temperature attending the aguish paroxysm, the quantity of urinary water and urea excreted may be as much increased as they always are during the attack.

Quinine is also an invaluable agent in some of those affections which, without belonging directly to the aguish category, have something of the intermittent quality impressed on them; for example, we often find that neuralgia and various forms of headache are distinctly periodic, and return at regular intervals. In such cases quinine works wonders and may effect a cure with almost magical rapidity.

Mode of Elimination.

Quinine, being possessed of considerable diffusive power, rapidly enters the blood, and is rapidly given out. It may be found in the urine in 30 minutes after ingestion; elimination is at its height in 2 or 3 hours, diminishes in 24 hours, and ceases in three days. Although traces of its presence have been found in the saliva, sweat, and intestinal secretion, it is by the urine that the greater part, probably about two-thirds, is given off, and, according to some authorities, the quinine is converted into a different allotropic form, partly amorphous, and quite inert, which has been called quinicine.

Disadvantages of its Use.

In addition to the headache, deafness, ringing in the ears, and other physiological phenomena, already noted, a good many cases have now been recorded of eruptions on the skin. In some of the quinine manufactories abroad, eczematous eruptions are observed in the workmen employed, and its internal administration has been occasionally followed by a bright-red, scarlatinoid rash, accompanied by intolerable itching and smarting and followed by copious desquamation, or, more rarely, by a rubeoloid eruption, rather suggestive of urticaria, and attended with marked gastric derangement, a curious point being that these unpleasant effects have usually followed very small doses, sometimes of only a single grain. Urinary irritation is also occasionally produced, more especially in the old, and consisting of dysuria, renal congestion, and even hemorrhage. And we must remember that idiosyncrasy here plays an important *role*, and that some persons cannot take a single grain without inconvenience.

Therefore, as before advised, it is always well, before prescribing quinine, to ask our patient if he has ever taken it before. If much prostration follows a large dose, strong black coffee with brandy is the best antidote.

Mode of Administration and Dose.

This salt is best prescribed in mixtures with a little nitric or dilute sulphuric acid, as tinctures do not dissolve it well; though, as Ringer says, it is really unnecessary to combine acid, as the quinine is readily soluble in the acid of the gastric juice. But a little acid makes a more elegant mixture, by removing that turbidity which a certain quantity of the undissolved alkaloid necessarily imparts to a solution. The dose varies from about gr. ij, which is the usual tonic dose, to 10, 20, 30 grains, or even more; and although in this country a larger quantity than 10 grains is perhaps rarely prescribed, it is clearly absurd to put the maximum dose, as in the British Pharmacopœia, so low as this.

A good way of obviating the headache and ringing in the ears is by adding to each dose ♏xxx of hydrobromic acid, which is also a good solvent.

[As urged by the late Prof. Alonzo Clark, quinine may be given by the rectum, in the ordinary form of suppositories, with almost if not quite as much efficacy and promptness of action as when given by the mouth. When given in the usual way it is found that to avoid its bitter taste is absolutely necessary in some cases. For this purpose it is sometimes ordered in sugar-coated pills, or inclosed in *cachêts de pain*. The powder may be given to children in a spoonful of syrup of red orange, or mixed with honey or molasses; it may also be taken in coffee, or simply suspended in cold water, or the powder sprinkled over the cut surface of an orange. The quinine may be enveloped in tissue paper and twisted tightly into a ball; a little practice will enable an adult to deftly swallow such a bolus without tasting, and with but little inconvenience. The aromatic elixir of glycyrrhizin has been recommended as the best vehicle for the administration of the sulphate of quinine;[1] but preparations containing licorice, such as the officinal fluid extract of taraxacum, or the compound licorice mixture, or the elixir of Yerba Santa, are quite satisfactory for this purpose. Tannin has the power of disguising the taste of quinine, and, according to Rolander, it does not detract from its therapeutic properties. The following formulæ will be found useful for the administration of quinine in solution :—

For children—

℞. Quininæ sulphatis	gr. xxiv ;	or	1	50 Gm.
Acidi tannici	ℨij ;	"	8	"
Syr. cinnamomi	f℥iij ;	"	96	" M.

S. Capiat cochleare parvum ter in die.

Or, as the disulphate—

℞. Quininæ sulphatis	gr. xxiv ;	or	1	50 Gm.
Acidi sulphurici dil.	fℨj ;	"	4	"
Tr. cardamomi co.	fℨiij ;	"	12	"
Syrupi	q. s. ad f℥iij ;	"	96	" M.

S. Dose, fℨj.

Or, in a cough mixture—

℞. Quininæ sulphatis	gr. xxiv ;	or	1	50 Gm.
Acidi sulphurici dil.	q. s. ad solve ;			
Mist. glycyrrhizæ co.	ad f℥iij ;	"	96	"

S. Dose, teaspoonful.

In the declining stage of *whooping-cough.*

For adults, any of the preceding prescriptions may be used, or we may give the following :—

℞. Quininæ sulphatis	gr. xlviij ;	or	3	20 Gm.
Acidi sulphurici dil.	q. s. ;			
Syrupi limonis	f℥ij ;	"	64	"
Aquæ	q. s. ad f℥vj ;	"	192	" M.

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[1] [Remington, Med. and Surg. Rep., vol. xxxvii. p. 88, Phila., 1877.]

each fraction containing one grain of quinine. A more pleasant preparation would probably be obtained by substituting Curaçoa cordial for the lemon syrup. As a tonic carminative the following proves very acceptable in weakened digestion:—

℞. *Quininæ sulphatis* gr. xlviij; or 3·20 Gm.
Acidi sulphurici dil. q. s. ad solut.;
Tr. gentianæ comp. f℥iv; " 128 "
Syr. zingiberis q. s. ad f℥vj; " 192 " M.
S. Capiat cochleare magnum ante cibum.

Wine of aloes may be appropriately added, should constipation be present in the case.]

℞. *Quininæ sulphatis* gr. viij; or .50 Gm.
Acidi nitrici diluti fʒss; " 2 "
Tincturæ aurantii f℥ss; " 16 "
Syrupi aurantii cort. f℥j; " 32 "
Aquæ q. s. ad f℥viij; " 256 " M.
S. Dose, f℥j ter die sumendus.

For a case of debility and want of appetite.

℞. *Quininæ sulphatis* gr. j; or .06 Gm.
Ferri et potassii tartratis gr. ij; " .13 "
Morphinæ acetatis gr. $\frac{1}{12}$; " .005 " M.
Ft. pil.

A useful combination in *neuralgia.*

Some persons, who object to sweets, prefer the syrup to be left out; but it will usually be found an agreeable addition. Quinine may also be given in the form of simple powder, suspended in a glass of sherry, and when a large dose, such as 10 grs., is prescribed, it is more conveniently taken in simple suspension in distilled water. A very common plan is to order quinine with acid infusion of roses, but Squire has pointed out that a turbid and unsightly mixture is thus produced from the resulting tannate of quinine being insoluble in sulphuric acid; whereas, if the infusion be made with nitric acid, the mixture is "bright and attractive in appearance."

Under the name of Warburg's tincture, a secret preparation of unusual complexity has recently been made public, and has been most highly recommended by Maclean in tropical diseases, and by Broadbent and Playfair in cases of shock and collapse. Under its use free perspiration sets in, and the temperature goes down, and it is believed that the action of the drug is materially aided by the powerful aromatics with which it is combined and the state of concentration in which it is given. Each one-ounce bottle contains 9½ grains of quinine, and it is best given on an empty stomach after preliminary evacuation of the bowels, the ounce being taken undiluted and repeated in 2 or 3 hours.

OTHER CONSTITUENTS.

In addition to quinine other alkaloids and substances have been detected in bark, some of which are of use in medicine. We have:—

1. Quinic or kinic acid.
2. Quino-tannic acid.
3. Cinchona red.
4. Kinovin.

These four have no therapeutic significance.

5. Cinchonina has some febrifuge power [and sulphate of cinchonine can in many cases take the place of quinine as an antiperiodic, at about one-eighth the cost].

6. Quinidine has been reported as nearly equal to quinine in the foregoing respect [and is an efficient substitute for the more expensive salt.]

7. Cinchonidinæ sulphas is also officinal and has some tonic properties.

None of these preparations have been able to completely take the place of quinine, as they are weaker, less certain in action, and less agreeable; and quinine, notwithstanding its comparatively high price, still retains its position as our most reliable antiperiodic.

Quinetum [or Hospital Quinine] is the mixed alkaloids of bark, and has been found to be very efficacious in chronic cases of ague.

The preparations of cinchona, as we said before, are principally used for their tonic properties; and there is perhaps no more pleasant and effectual medicine of this class than the ordinary tincture of bark, whilst the decoction or infusion is useful as a vehicle for more active drugs.

[The bimuriate of quinine with urea, quininæ bimuriaticum carbamidatum, is a very soluble form of double salt lately introduced, which has especial advantages for the hypodermic method in treating severe forms of *ague*.

The relative therapeutic activity of the ordinary alkaloids as compared with each other is thus given by Bartholow :—

Quinidine is entitled to the first rank as an antiperiodic.

Quinine (usually given in doses that are too small).

Cinchonine is about one-half the strength of quinine.

Cinchonidine is a little stronger than cinchonine.

Quinoidine, or chiniodine (amorphous), is about one-fourth the strength of quinine.

The *salicylates* of *quinine* and *cinchonidine* have been introduced, and are especially recommended for *neuralgia*.]

[**Chinolin.** — The tartrate and salicylate of chinolin have been introduced as substitutes for the cinchona alkaloids, attention having been directed to them, under the name of artificial quinine.

The ordinary commercial chinolin is a reddish-brown liquid, while the tartrate is a white crystalline powder. It often has a disgusting tobacco-like odor, due to some uncombined chinolin or to slow decomposition. Rueber[1] found that by repeated distillations of chinolin made synthetically according to Skraup's method (48 parts nitro-benzole, 76 parts aniline, 240 parts of glycerine, and 200 of English sulphuric acid), he obtained a *colorless*, transparent, oily liquid which remained unchanged after six months, from which a specimen of fine acicular crystals of chinolin tartrate was obtained, which possessed only a faint odor. The salt was insoluble in ether, soluble in 65 parts of alcohol and in 20 parts of water at 15° C.; but water at 100° dissolves six times as great a proportion; the excess afterwards deposits on cooling. The author confirms the experience of Dr. Donath as to the value of this salt as an antiseptic, and asserts that it possesses no properties which would render it deleterious to health when used for the preservation of articles of food.

The tartrate of chinolin is said to have decided effect in periodical neuralgia and in intermittent fever, in doses of one or two grammes to adults, given in waters or *cachêts de pain;* it may be given to children in equal parts of syrup and distilled water. Peppermint is recommended as a vehicle for disguising the taste. It is said not to produce tinnitus or other cerebral disorder. In *malaria*, it has proved efficient in some cases, but requires to be given in doses larger than quinine.

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[1] [Monthly Review of Medicine and Pharmacy, translated from Schweizerische Wochenschrift, No. 49.]

The physiological action of the tartrate of chinolin may be summed up as that of a decided apyretic and powerful antizymotic. Dr. Donath declares that it is superior in its antiseptic power to salicylic, boric, and carbolic acids, or to copper sulphate and alcohol. In the proportion of 0.2 per cent. it arrests fermentation in milk and the development of bacteria; a 0.4 per cent. solution will prevent decomposition of blood or the curdling of milk. When administered internally, it has not been found in the urine, and appears to be decomposed in the system. As a local antiseptic, it has special advantages.]

CINNAMOMUM—CINNAMON.

[*The inner bark of the shoots of Cinnamomum Zeylanicum, Breyn (Ceylon Cinnamon), or the bark of the shoots of one or more undetermined species of Cinnamomum, grown in China (Chinese Cinnamon) (N. O. Lauraceæ).*

Oleum Cinnamomi. Dose, gtt. j–ij (.06 to .12 Gm.).

OFFICINAL PREPARATIONS, U. S.

Tinctura Cinnamomi (℥jss to Oj). Dose, fʒj–ij 4. to 8. Gm.).
Aqua Cinnamomi. As a vehicle. Dose indefinite.
Pulvis Aromaticus (see CARDAMOM). Dose, gr. x–xx (.60 to 1.30 Gm.).
Spiritus Cinnamomi (oil, 10 per cent.). Dose, fʒj–ij (4. to 8. Gm.).

Also enters into Acidum Sulphuricum Aromaticum, Tinctura Catechu Composita, Tinctura Lavandulæ Composita, Syrupus Rhei, Tinctura Rhei Aromatica, Syrupus Rhei Aromaticus, Tinctura Cardamomi Composita, Tinctura Catechu Composita, and Vinum Opii.]

Cinnamon is principally used for flavoring purposes, but also seems to have slight astringent properties, which make it useful in *diarrhœa*. [It has been also strongly recommended in *uterine hemorrhage*, given in substance, or as a decoction made with milk.]

[COCCUS—COCHINEAL.

The dried female of Coccus cacti, Linné (Class Insecta; Order Hemiptera).

It enters into Tinctura Cardamomi Composita.

Cochineal has been considered to possess antispasmodic and anodyne properties, and has been recommended in *whooping-cough* (gr. $\frac{1}{3}$, s. t. d., to infants) combined with carbonate of potassium. It is also used in *neuralgia*. In pharmacy it is used as a coloring agent.]

[CODEINA—CODEINE.

An alkaloid prepared from Opium.

See Opium.]

COLCHICI RADIX—COLCHICUM ROOT.

[*The corm of Colchicum autumnale, Linné (N. O. Melanthaceæ).*]

COLCHICI SEMEN—COLCHICUM SEEDS.

[*The seed of Colchicum autumnale, Linné (N. O. Melanthaceæ).*

Dose, of either, gr. ij–v (.13 to .32 Gm.).

Officinal Preparations, U. S.

Extractum Colchici Radicis. Dose, gr. j–ij (.06 to .12 Gm.).

Extractum Colchici Radicis Fluidum. Dose, ♏ ij–iv (.12 to .24 Gm.).

Vinum Colchici Radicis (40 parts; stronger white wine q. s. to make 100). Dose, gtt. x–xv (.60 to 1. Gm.). As a purgative, ♏ xxx (2. Gm.).

Extractum Colchici Seminis Fluidum. Dose, ♏ ij–vj (.12 to .40 Gm.).

Tinctura Colchici (seeds, 15 parts; dilute alcohol q. s. to make 100). Dose, ♏ v to f℥j (.30 to 4. Gm.).

Vinum Colchici Seminis (seeds, 15 parts; stronger white wine q. s. to make 100). Dose, ♏ x to ℥j (.65 to 4. Gm.).]

INTERNAL ACTION.

Physiological.

The leading physiological action of colchicum is undoubtedly directed to the intestinal canal, large doses causing free vomiting and copious purging of yellowish feces containing a large quantity of bile. The action of the heart is usually somewhat depressed.

Christison, Maclagan, and others assert that the proportions of urea and uric acid, as well as the amount of urine excreted, are increased, but this is denied by Gubler.

Gubler denies all specific action, believing it to be a spoliative; and only exerting its full powers when physiological effects are produced, from three to four stools a day being recommended. He believes it to be "cumulative."

Therapeutical.

As the experiments of Rutherford have shown that colchicum increases the biliary secretion, it may be a useful adjunct to cholagogue pills, although its own purgative action is too violent to be encouraged.

Its principal use is as a remedy for *gout*, more especially the acuter forms, and here it never fails to remove pain rapidly, without, however, in any way lessening the tendency to future attacks. How it acts is unknown, and we can only call it a specific. It is also very valuable in various diseases of gouty parentage, as in some forms of *dyspepsia*, *bronchitis*, etc.; but in *acute rheumatism* it has been proved to exert rather a noxious than a beneficial influence.

DOSE AND MODE OF ADMINISTRATION.

Colchicum may be given either in one or two full doses, or in smaller quantities spread over a longer time. Of these plans the former is probably the more effectual in an acute attack of gout. Alcohol is said to be the best solvent, because all acids, even those of urine and vinegar, transform the colchicine into colchiceine, a neutral glucoside of very inferior strength. The following formulæ are suitable for various gouty conditions:—

℞.	Tincturæ colchici	♏xx;	or	1	30	Gm.
	Potassii bicarbonatis	gr. x;	"		60	"
	Aquæ pimentæ [Br.]	f℥j;	"	32		"

Misce, fiat haustus ter die sumendus.

℞.	Tincturæ colchici	♏xv;	or	1		Gm.	
	Magnesii carbonatis	gr. vj;	"		40	"	
	Magnesii sulphatis	gr. xxx;	"	2		"	
	Aquæ menthæ piperitæ q. s. ad	f℥j;	"	32		"	M.

S. Pro dosa, ter die sumendus.

[℞.	Ammonii carbonatis	gr. xl;	or	2	60	Gm.	
	Sodii bicarbonatis	ʒiss;	"	6		"	
	Tincturæ colchici	fʒij;	"	8		"	
	Syrupi aurantii	fʒiv;	"	16		"	
	Aquæ	q. s. ad f℥viij;	"	256		"	M.]

S. Capiat unciam bis in die.

℞.	Extracti colchici radicis	gr. x;	or		65	Gm.
	Pulveris digitalis,					
	Extracti colocynthidis comp.,	āā ℈j;	"	1	30	"

Misce, fiant pilulæ xx. Sumat unam bis terve in die.

℞.	Potassii iodidi,						
	Ammonii carbonatis,	āā ℈j;	or	1	30	Gm.	
	Vini colchici	fʒj;	"	4		"	
	Tincturæ scillæ,						
	Tincturæ hyoscyami,	āā fʒij;	"	8		"	
	Aquæ camphoræ	q. s. ad f℥iij;	"	96		"	M.

S. f℥ss ter die.

Dr. Greenhow's formula for gouty bronchitis.

[Scudamore's mixture :—

℞.	Magnesii sulphatis	℥i–ij;	or	32		Gm.	
	Magnesiæ	ʒij, gr. xl;	"	10	60	"	
	Aceti colchici [Br.]	f℥j–iss;	"	32		"	
	Syrupi croci [Br.]	f℥j;	"	32		"	
	Aquæ menthæ pip.	f℥x;	"	320		"	M.

Dose, f℥ss–iss repeated every 2 hours in a paroxysm of gout until from four to six evacuations are produced in the 24 hours.]

[The acetum colchici was omitted from the Pharmacopœia in the last revision. It was made from the *corm*, and was only one-third the strength of the officinal wine of colchicum root. In making preparations the fresh seed should be used, as the old seed and its preparations are less active; some samples of fluid extract contain no colchicine at all.] The active principle colchicine is from 80 to 100 times more powerful than the plant, and has been used hypodermically in chronic rheumatism and gout. Dose, gr. $\frac{1}{32}$ (.002 Gm.).

[COLLODIUM—COLLODION.

Pyroxylon 4 parts, dissolved in stronger ether 70 parts, and alcohol 26 parts, cantharides 60 parts, flexible collodion 85, commercial chloroform q. s. to make 100 parts.

Collodium cum Cantharide. Blistering Collodion.

Collodium Flexile. Flexible Collodion. (Collodion 92. Canada turpentine 5, castor oil 3.)

Collodium Stypticum. (See TANNIC ACID.)]

Collodion is used to fulfil two indications:—

1. To exclude the action of the air from inflamed parts, and to prevent the patient from scratching and irritating the surface.

2. To exert a moderately constringent effect, from the contraction which follows its drying, and the gentle compression which can thus be exerted may be of great service in checking inflammatory conditions. Mr. Gamgee praises its use highly in *orchitis*, where it should be freely painted over the testicle and cord.

1. For this purpose it is used to paint over the pustules of *smallpox*, in the hope of preventing pitting. Also, in *herpes zoster* and in *erysipelas* it may be applied with advantage.

2. Dr. Hale tells us that, at the very early or papular stage of a boil, we may avert subsequent suppuration by the application of collodion. [In the early stage of a boil it may sometimes be aborted by touching the top with a drop of cantharidal collodion.]

Sir D. Corrigan recommends sealing up the extremity of the prepuce by collodion to remedy the nocturnal form of *incontinence of urine* in children; and it may be of service in hemorrhage depending on capillary oozing, and more especially in the troublesome bleeding frequently following leech-bites.

Finally, its application may facilitate the healing process in small cuts and wounds, as after the operation of harelip, and in the troublesome condition known as *cracked nipples*. Under all these conditions the best results may be obtained by using the flexible collodion, in which the combination with castor-oil prevents the too rapid cracking or peeling away of the protecting film.

Under the name of styptic colloid, Dr. Richardson has introduced an efficient remedy for checking capillary oozing and promoting the healing of slight wounds. It is thus composed: Collodion 100 parts; carbolic acid 10 parts; tannin 5 parts; benzoic acid 5 parts.

Collodium flexile is made with Canada balsam and castor-oil, and *collodium vesicans* [Br.] is now an official preparation.

Flexible collodion and chrysophanic acid form a good combination, and Mr. Carteighe tells me that flexible collodion with salicylic acid and extract of Indian hemp is an excellent application to soft *corns*.

COLOCYNTHIS—COLOCYNTH.

[*The fruit of Citrullus Colocynthis deprived of its rind, Schrader* (*N. O. Cucurbitaceæ*).

OFFICINAL PREPARATIONS, U. S.

Extractum Colocynthidis (alcoholic). Used only in combination. Dose, gr. ij–v (.12 to .30 Gm.).

Extractum Colocynthidis Compositum (aloes 100, ext. colocynth 32, resin of scammony 28, cardamom 12, and soap 28 parts). Dose, gr. v–xxx (.30 to .2 Gm.).

Pilulæ Catharticæ Compositæ. See page 216.

Physiological Action.

Colocynth produces a good deal of irritation of the large intestine, causing profuse watery evacuations, and, if given in excessive dose, even proving fatal by inflammation

Therapeutical Action.

Bitter cucumber is a drastic purgative, rapid and efficient in its action, and much used as an ordinary remedy in *habitual constipation* and various dyspeptic conditions.

and ulceration. It is found, however, that its drastic action, as well as the griping to which it occasionally gives rise, may be obviated by combination with aromatics and other purgatives.

In large doses it is a powerful hepatic as well as intestinal stimulant. It renders the bile more watery, but increases the secretion of biliary matter.

MODE OF ADMINISTRATION.

Colocynth is rarely, if ever, prescribed alone. The officinal compound extract and pill, containing, in addition, aloes and scammony, are useful formulæ; but the best mode of combination is undoubtedly that with either hyoscyamus or belladonna, the dose being from 5 to 10 grains.

[Confectiones.

The officinal CONFECTIONS are:—

Confectio Rosæ (Red Rose 8, Sugar 64, Clarified honey 12, Rose water 16).

Confectio Sennæ (Senna 10, Coriander 6, Cassia Fistula 16, Tamarind 10, Prune 7, Fig 12, Sugar 50, Water 60, to make 100 parts). Dose ʒj–ʒij (4–.89 Gm.).]

CONIUM—HEMLOCK.

The full-grown fruit of Conium maculatum, Linné (N. O. Umbelliferæ, Campylospermæ), gathered while yet green.

Dose, grs. ij–v (.13–30 Gm.).

OFFICINAL PREPARATIONS, U. S.

Extractum Conii Fluidum. Dose, ♏j–v (.06 to .30 Gm.). Seguin says that much larger doses are often well borne.

Abstractum Conii. Dose, gr. j–iv (.06 to .25 Gm.).

Extractum Conii Alcoholicum. Dose, gr. ½–ij (.03 to .12 Gm.).

Tinctura Conii (15 per cent.). Dose, fʒss–j (2. to 4. Gm.).

TEST.—Conine, a liquid alkaloid, the active principle of conium, is volatile, and exhales a strong mouse-like or urinous odor. With the vapor of hydrochloric acid, it forms dense white fumes. The odor of conine is so characteristic, that it can scarcely be confounded with any other poisonous agent.

ANTIDOTES.

Atropine has been suggested as a physiological antidote.]

LOCAL ACTION.

Conium has been occasionally used in the form of poultice as an application to cancerous sores or tumors, and it is said that the severe lancinating pain common to these affections may thus be mitigated.

INTERNAL ACTION.

Physiological.

I. *On Nervous System.*—1. *Brain.*—No effect is produced on the brain proper, it having been observed in cases of poisoning, and notably in that of Socrates, and in a patient under Prof. Bennett's care, that the intellectual faculties are quite unimpaired to the last.

Dr. John Harley, however, is of opinion that a considerable portion of the action of conium is expended on the motor ganglia, and more especially the corpus striatum.

2. *Spinal Cord.*—Pure conium has no special influence on the spinal nervous system, but an alkaloid, methyl-conine, which it usually contains, has been proved to cause first exaltation, and

Therapeutical.

I. To this action Dr. Harley ascribes the beneficial influence of conium in *chorea*. Although in many cases we may derive real advantage from this remedy, it often fails, and in order to insure the full amount of benefit we must use large doses, and see that the drug is pure. Dr. Harley also recommends it in the nervous twitchings met with in some cases of hemifinally depression of the reflex function of the cord.

3. *On the Nerves.*—Herein lies the true physiological action of conium. It acts first on the third nerve, causing drooping of the eyelid, dilatation of the pupil, and sluggish and impaired movement of the eyeball. The influence then spreads to all the other motor or efferent nerves. A sensation of weight and enfeeblement of the legs, followed by staggering, is first experienced, and finally total paralysis is developed, the victim being entirely unable to move; and so complete may this become, that asses in Italy which have fed on hemlock have been flayed alive without the possibility of resisting in any way. This paralyzing influence is at first confined to the terminal extremities of the nerves. Conium usually contains some methyl-conine, which considerably modifies the action of the pure alkaloid. This substance does not, like conine, expend its action on the end organs of the motor nerves, but extends to the cord, first exalting and finally abolishing its reflex function.

The sensory nerves are quite unaffected.

II. *Vascular System.*—

plegia. Conium has been given with some benefit in the *convulsions* of children.

3. Dr. Harley recommends its use in the violent spasm of the orbicularis met with in keratitis, but I have been unable to confirm this after careful trial.

The remarkable power of conium in affecting muscular relaxation would indicate its use in a variety of spasmodic conditions. Thus, in *laryngismus stridulus*, *trismus*, *spasmodic wry neck*, *spasmodic stricture* [*hysteria*, and *insanity*], and perhaps in the reduction of *hernia* and *dislocation* where any contra-indication to the use of anæsthetics exists, it seems worthy of trial; and Dr. Handfield Jones recommends it highly in *paralysis agitans*. It must, however, be confessed that the therapeutical success of conium by no means comes up to its physiological promise. [Dr. Seguin, of New York, explains its failure by the smallness of the quantity usually ordered. In chronic convulsive disorders he gives as much as a drachm at a dose and never less than twenty minims for adults. In the latter amount he gives it as an indirect hypnotic, in combination with bromide of potassium.

No effect is produced on the heart or circulation.

III. *Respiration and Temperature.*—The breathing is at first unaffected, but, as the poisonous action of the drug goes on, the paralysis spreads to the respiratory centre, and death ensues from asphyxia.

Some lowering of the temperature has been observed.

IV. *Secretion.*—No influence on secretion has been noted.

From these truly extraordinary doses of the fluid extract he claims never to have had any serious or threatening symptoms produced.]

Dr. Crichton Brown has seen good results from the use of conium in mania with violent motor excitment, in which it restrains the violent muscular movements; and Dr. R. Burman has used conine by subcutaneous injection successfully in the same class of cases.

Mode of Elimination.

The presence of conium has been detected in the blood, and its elimination is effected by the breath and urine.

Mode of Administration, Cautions, etc.

It having been satisfactorily proved that the succus is the most active preparation of hemlock, it is not necessary for us to say anything about the tincture, extract, vapor, or compound pill. Unfortunately, however, it is often difficult to obtain an efficient succus, as it keeps ill, and cannot always be satisfactorily made, the cultivated plant, which is sometimes used, being quite inert. Disappointment frequently occurs both from this cause and from the smallness of the dose often given in accordance with the recommendation of the Pharmacopœia. In order to obtain any decisive effect we must give, of some preparations, as much as from half an ounce to 3 or even 4 ounces, as has been done by Dr. Harley, remembering that the limit of safety is reached when any interference with involuntary movement is observed, this being best indicated by enfeeblement of deglutition.

Children bear conium-juice remarkably well. I have given ounce doses to a girl of eight, and the late Dr. Anstie gave to a girl of seven, suffering with chorea, ℥viij in 24 hours, without the slightest development of physiological symptoms. [On account of the uncertainty of the strength of juice, it is best to begin with small doses, and carefully increase them until some paralytic effect is produced. Death has been caused by 150 minims of Squibb's fluid extract. Attention has been called by Dr. Squibb to the danger of diluting the fluid extract, for a precipitate may be formed containing the active principle, and by this means a poisonous dose may finally be given. He had seen serious symptoms but never fatal accident from this cause.—*Trans. Med. Soc. State of New York*, 1882.]

HYPODERMIC USE.

The alkaloid conine has been occasionally used by subcutaneous injection, but is objectionable from being very variable in strength. When injected pure it is not only physiologically inert, but is very irritating, and the addition of acetic or hydrochloric acid is necessary to insure physiological action. When taken by the mouth it is rapidly and certainly poisonous, from 10 to 15 minims having proved fatal.

℞. Coninæ	ʒiij, ♏xij ;	or	12	80 Gm.
Acid. acetici fort.	fʒijss ;	"	10	"
Alcoholis	fʒj ;	"	4	"
Aquæ destillat. q. s. ad ℥iij :		"	96	" M.

Seven and a half minims of this solution contain one minim of conine, the dose being $\frac{1}{16}$ to $\frac{1}{3}$ of a minim.

COPAIBA—COPAIBA.

[*The oleo-resin of Copaifera, Langsdorffii, Desfontaines, and of other species of Copaifera (N. O. Leguminosæ, Papilionaceæ).*

Dose, ♏xv to ʒj (1 to 4 Gm.).

OFFICINAL PREPARATIONS, U. S.

Massa Copaibæ (Copaiba 94, magnesia 6). Dose, gr. x–xxx (.65 to 2 Gm.).

Oleum Copaibæ. Dose ♏viij–xv (.50 to 1 Gm.).

Resina Copaibæ. Dose, ♏viij–xv (.50 to 1 Gm.).]

LOCAL ACTION.

Physiological.	*Therapeutical.*
Copaiba locally applied seems to act as a slight stimulant to the skin.	It has been used in this way in certain obstinate affections of the skin, such as

psoriasis; and in India it seems to have been employed with some success in *leprosy* and *lupus*, bearing as it does a considerably analogy to the gurjun oil which has lately acquired so high a reputation in the treatment of the first-mentioned disease. Its nauseous smell, however, must always be a serious barrier to its use.

CONSTITUTIONAL ACTIONS.

I. *Brain and Nervous System.*—No influence is exerted by copaiba on the brain, spinal cord or nerves.

II. *Heart and Circulation.*—No effect is produced on these organs, or on the respiration and temperature.

III. *Digestive and Secreting Organs.* — 1. *Stomach and Intestines.*—Copaiba frequently causes most violent vomiting and purging.

2. It has a stimulating effect on mucous membranes generally, but more especially on those of the genito-urinary tract, in virtue of which, after slight preliminary irritation, it checks and finally arrests excessive discharges.

3. *Kidneys.*—Copaiba, and more particularly the resin, increase very considerably the water of the urine without specially affecting the solid constituents.

Copaiba is an excellent remedy (1) in *gonorrhœa*, where it may be given with great effect as long as the discharge continues thick and puriform. When the earliest inflammatory symptoms have been subdued by alkalies and diluents, it will prove our best remedy, and it seems to act neither purely locally nor constitutionally, but in both ways conjointly, being altered in some way in the blood, and then exerting

4. Copaiba, by internal administration, seems to stimulate the skin, and occasionally produces an eruption of bright red papules, not unlike measles, usually beginning on the hands, spreading over the body, and causing much tingling and itching.

a topical influence on the affected mucous tract. (2) It is also of service in *chronic cystitis*, and in the later stages of bronchitis, when profuse and exhausting discharges have been established from the bronchial tubes. (3) As a diuretic, the resin has been most highly praised by Dr. Wilks and Dr. F. Taylor in the *dropsy* of heart disease, in *ascites*, and in some forms of *renal affections*. (4) Dr. Liveing, more especially, has drawn attention to the value of copaiba in *psoriasis* and other obstinate skin diseases.

Absorption and Mode of Elimination.

Copaiba is very rapidly absorbed into the blood, as indicated by the communication of its nauseous smell to the breath and urine, by which channels it is principally eliminated. On the addition of nitric acid to the urine of patients taking copaiba, a milky appearance is produced by precipitation of the resin, and this is distinguished from albumen by the action of heat, which melts the resin and removes the deceptive cloud.

Peculiarities. Mode of Administration.

The digestive disturbance occasionally caused by copaiba prevents some persons from taking it at all, and the almost invincibly nauseous nature of its flavor and odor is a serious drawback to its use. Capsules both of sugar and gelatine have been devised, which are frequently well borne; but we must remember not only that these are often too large to be swallowed with comfort by nervous persons, but that their use is apt to be followed by disagreeable eructation. No means have been proposed to obviate the measly and irritable rash which not unfrequently appears on the skin of patients under the influence of copaiba; but various forms of prescriptions are in general use, and some of these are moderately effectual in concealing the offensive flavor of this useful drug.

℞. Copaibæ,					Gm.	
Liquoris potassæ, āā	f ʒss;	or	2			
Misce, agitando, et adde—						
Mucilaginis acaciæ	f ʒij;	"	8		"	
Spiritus ætheris nitrosi	f ʒss;	"	2		"	
Tincturæ opii	♏v;	"		30	"	
Aquæ q. s. ad	f ℥j;	"	32		"	M.

Fiat haustus ter die sumendus.

For *gonorrhœa.*

℞. Copaibæ,					Gm.	
Syrupi tolutani,						
Pulveris acaciæ, āā	f℥ss;	or	16		"	
Acidi sulphurici aromat.	f ʒss;	"	2		"	
Aquæ destillatæ	f ℥vj;	"	192		"	M.

S. f℥ss ter in die.

For *gonorrhœa.*

℞. Resina copaibæ	ʒiij;	or	12	Gm.	
Alcoholis	f ʒv;	"	20	"	
Chloroformi	f ʒj;	"	4	"	
Mucilaginis acaciæ	f ℥ij;	"	64	"	
Aquæ q. s. ad	f℥xij;	"	384	"	M.

S. Capiat semunciam ter in die.

Formula for copaiba as a diuretic.

[CORIANDRUM—CORIANDER.

The fruit of Coriandrum Sativum, Linné (N. O. Umbelliferæ, Cœlospermæ).

Dose, gr. xx (1.30 Gm.).

Oleum Coriandri. Dose, ♏j–v (.06 to .30 Gm.).

Enters into Confectio Sennæ.

USES.

Coriander seed is aromatic and stomachic; it is rarely used except in combination.]

[CORNUS—CORNUS (DOGWOOD).

The bark of the root of Cornus Florida, Linné (N. O. Cornaceæ).

OFFICINAL PREPARATION, U. S.

Extractum Cornus Fluidum. Dose, fʒss (2. Gm.).

Dogwood is an indigenous, astringent tonic, and has been recommended as an antiperiodic as a substitute for cinchona.]

CREASOTUM—CREASOTE.

[*A product of the distillation of wood-tar.*

OFFICINAL PREPARATION, U. S.

Aqua Creasoti (one per cent.). Dose, fʒss–iv (2. to 16. Gm.).]

This drug [dose, gtt. i–x (.06 to .65 Gm.), diluted] is now but little used [owing to the difficulty of obtaining it pure, the commercial article being largely contaminated with cresylic or carbolic acid]; but it is a useful remedy in some forms of sickness and vomiting, as an inhalation for *ozæna* and various lung diseases with *fetid expectoration*, and as a local application in *toothache*.

[Beechwood creasote has been used in the treatment of phthisis with excellent results by Beverley Robinson and others. Dose, gtt. iij–xv after meals. It may be given with compound tincture of gentian and whisky. A mixture of equal parts of creasote, alcohol and spirits of chloroform is used with the inhaler, with good effect.[1]]

The mistura creasoti [Br.], containing ♏j to the ounce, is a convenient mode of administration. [The ointment (ʒss–℥j) is sometimes used in *scaly eruptions*.]

[CRETA PRÆPARATA—PREPARED CHALK.

Native friable carbonate of calcium ($CaCo_3$–100), *freed from most of its impurities by elutriation.*

(For Preparations, see CALCIUM.)]

[[1] Dr. Austin Flint, Jr., N. Y. Med. Jour. Dec. 8, 1888.]

CROCUS—SAFFRON.

[*The stigmas of Crocus sativus, Linné (N. O. Iridaceæ).*

Officinal Preparation, U. S.

Tinctura Croci (10 per cent.). Dose, fʒj–ij (4 to 8 Gm.).]

Saffron is never used, save as a coloring agent. [Saffron-tea is sometimes used in domestic practice and by irregulars as a diuretic, and for infantile jaundice. It probably has no advantage over warm water.]

CUBEBA—CUBEB.

[*The unripe fruit of Cubeba officinalis, Miquel (N. O. Piperaceæ).*

Dose of the powder, gr. xx to ʒij (1.60 to 8. Gm.).

Officinal Preparations, U. S.

Extractum Cubebæ Fluidum. Dose, ♏x–ʒss (.65 to 2 Gm.).

Oleo-Resina Cubebæ (8 times the strength of the powder). Dose, ♏x–xxx (.60 to 2. Gm.).

Oleum Cubebæ. Dose, ♏v–xij (.30 to .80 Gm.).

Tinctura Cubebæ (10 per cent.). Dose, fʒss–ij (2. to 8. Gm.).

Trochisci Cubebæ (each contains gr. ½ of the oleo-resin). Dose 1 to 5.]

Physiological Action.

Cubebs also has a stimulating action on mucous membranes, and more particularly on that of the bladder and urethra. In large doses it causes considerable gastro-intestinal irritation.

Therapeutical Action.

Cubebs is occasionally used in *cystitis*, but it has long been known as one of the most efficient and generally prescribed remedies for *gonorrhœa*, acting best during the acute stage of the disease.

It has also been found useful when given in the form of lozenges for the relief of relaxed sore-throat.

[The following prescription was employed at Prof. Jos. Pancoast's clinic:—

℞.	Aluminis	ʒj;	or	4	Gm.
	Cubebæ,	ʒvii;	"	28	"
	Myristicæ,				
	Cinnamomi,	āā ʒij;	"	8	" M.

Fiat pulvis et divide in chartæ No. xx.

One to be given several times a day in *gonorrhœa*.]

CUPRUM—COPPER.

[**Cupri Acetas.** Acetate of copper ($Cu(C_2H_3O_2)_2H_2O$–199.2).

Cupri Sulphas. Sulphate of copper ($CuSo_4,5H_2O$–249.2).

As an emetic, sulphate of copper is given in doses of gr. ij–v (.12 to .30 Gm.).

POISONING.

The salts of copper in large doses cause vomiting, pain in the bowels, cramps in the lower extremities, a strong coppery taste, diarrhœa, convulsions, palsy, insensibility, and death. Marks of inflammation in the stomach and intestines are often noticed after death. When the case has been protracted, there is often a green tinge of the lining membrane, and a jaundiced appearance of the skin.

TESTS.

The sulphate in a solid state presents a bright blue color, and leaves an astringent metallic impression on the tongue. When in solution the transmission of sulphuretted hydrogen affords a brownish-black (sulphuret of copper) precipitate. Solution of ammonia precipitates a blue substance, which, on further addition of ammonia, becomes dissolved; but when only a small amount of the poison is present, no precipitation occurs, a clear violet-colored solution being then at once presented. Ferrocyanide of potassium throws down a reddish-brown (ferrocyanide of copper) precipitate. A piece of polished zinc or iron (as the blade of a table-knife) acquires a plating of copper, if placed in a liquid containing the above salt.

The tests for the acetate are the same as the preceding, except the last.

The ammonio-sulphate has a brilliant violet-blue color and ammoniacal odor. Solution of arsenious acid produces a fresh apple-green precipitate.

ANTIDOTES.

Albumen, ferrocyanide of potassium, followed by prompt evacuation of the stomach. Vomiting should be promoted by copious draughts of warm water, milk, or mucilaginous fluids. Sugar was formerly recommended. Albumen and milk form an insoluble compound with copper, provided they are in large excess. The protosulphuret of iron, and iron filings, have also been employed with advantage; but their action is too slow. The hydrated oxide of iron has been successfully administered where the arsenite of copper has been taken.]

LOCAL ACTIONS.

Physiological.	*Therapeutical.*
Copper has caustic astringent properties both in substance and solution.	In the form of the familiar blue-stone, or sulphate of copper, it is used as an application to *venereal sores*, *ulcers* in the throat, *granular lids*, to check exuberant granulations, etc.; and in solution it is a good lotion for various ulcerative surfaces, *gleet*, etc.

INTERNAL ACTIONS AND USES.

Physiological.	*Therapeutical.*
1. *Brain and Nervous System.*—Copper probably acts in some measure as a nervine tonic, but when given in larger doses peculiar symptoms set in, not unlike those of lead poisoning, and consisting of headache, neural-	1. Copper has been used in small doses in *chorea*, *epilepsy*, etc., but with no specially marked benefit. [In the treatment of chronic *malarial poisoning*, copper in the form of the sulphate is sometimes added to quinine and

gic pains, cramp, and even paralysis.

2. *Circulation and Respiration.*—No special effect.

3. *Secreting Organs.*—Copper causes prompt and effectual evacuation of the contents of the stomach, acting as a direct emetic. It has an astringent influence over the stomach and intestines, and this, if pushed too far, may end in gastro-enteritis.

piperine, and administered in the form of a pill with excellent results.]

3. Copper is not so much used, however, for an emetic, as sulphate of zinc, because, if by any chance it be not rejected by vomiting, it is liable to cause inflammation of the stomach.

Sulphate of copper is a good astringent in advanced and ***obstinate diarrhœa.***

MODE OF ELIMINATION.

Copper is eliminated chiefly by the liver and kidneys, the intestinal canal, and the salivary glands.

METHOD OF ADMINISTRATION.

Sulphate of copper is the only salt of the metal used in medicine, and may be prescribed as follows:—

℞. Cupri sulphatis,
Pulveris opii, āā gr. ss; or |03 Gm.
Extractum gentianæ gr. iij; " |20 " M.
Misce, fiat pilulæ nocte maneque sumenda.

In a case of ***obstinate diarrhœa.***

The oleate of copper has recently obtained a considerable reputation as an application in ringworm.

[CYDONIUM—CYDONIUM (QUINCE SEED).

(*The seed of Cydonia Vulgaris, Persoon (N. O. Rosaceæ Pomeæ.)*)

The only officinal preparation, the mucilage of quince seed (Mucilago Cydonii 2 per cent.), is used as a vehicle, and as a hair-dressing.]

[CYPRIPEDIUM—CYPRIPEDIUM (LADIES' SLIPPER).

The rhizome and rootlets of Cypripedium pubescens, Willdenow, and of Cypripedium parviflorum, Salisbury (N. O. Orchidaceæ).

OFFICINAL PREPARATION.

Extractum Cypripedii Fluidum. Dose, ♏x–xx (.65 to 1.30 Gm.).

This agent has been popularly employed in the treatment of nervousness, and nervous functional disorders; it is said to have been used successfully in migraine, hypochondriasis and insomnia. It resembles valerian in its effects upon the system, and contains a volatile oil, and a bitter principle, with resin and tannic acid. Cypripedin, so-called, is a dry alcoholic extract. Dose of the crude drug is about 15 grains, given several times a day. A tincture and an oleo-resin have also been used, the latter in doses of from gr. ss–iij.]

[Decocta.

An ordinary decoction, the strength of which is not directed by the physician nor specified by the Pharmacopœia, shall consist of 10 parts of the coarsely comminuted drug, with cold water 100 parts, raised to a boiling point for fifteen minutes and strained, and enough water added through the strainer to make the product weigh 100 parts.

The officinal DECOCTIONS are: Decoctum Cetrariæ (5 per cent.); and Decoctum Sarsaparillæ Compositum (Sarsaparilla, 10; Sassafras, Guaiacum wood, Licorice root, āā 2; Mezereum, 1 part; Water q. s. to make 100 parts).]

DIGITALIS—DIGITALIS (FOXGLOVE).

[*The leaves of Digitalis purpurea, Linné (N. O. Scrophulariaceæ), gathered from plants of the second year's growth.*

Dose, in substance, gr. ss–ij (.03 to .13 Gm.).

OFFICINAL PREPARATIONS.

Abstractum Digitalis. Dose, gr. ss–j (.03 to .06 Gm.).

Extractum Digitalis. Dose, gr. ¼–½ (.01 to .03 Gm.).

Extractum Digitalis Fluidum. Dose, ♏ j–ij (.06 to .12 Gm.).

Infusum Digitalis (1.5 per cent.). Dose, f℥j–iv (4. to 16. Gm.).

Tinctura Digitalis (15 per cent.). Dose, ♏ v–x (.30 to .60 Gm.).

Digitalin[1] is no longer officinal.]

POISONOUS EFFECTS.

Digitalis kills by tetanizing the heart muscle, causing rapid and irregular action, followed by arrest of action. The face grows pale, the pupils dilate, vomiting and diarrhœa supervene, and death usually occurs by syncope. Cases of poisoning, however, are rare, and most of our knowledge under this heading has been derived from experiments on animals.

ANTIDOTES.

After evacuation of the stomach and the administration ot tannin, we must obviate the tendency to death by stimulants, and by keeping the patient rigidly to the horizontal posture, as syncope is readily excited by suddenly sitting up.

Aconite and atropine have been recommended as physiological antidotes, but we have as yet no evidence of their efficacy.

LOCAL ACTION.

Physiological.	*Therapeutical.*
Digitalis has been said to possess sedative properties when locally applied, and there is no doubt that it is rapidly and efficiently absorbed by the skin.	Digitalis has been used as a local sedative in cases of *joint inflammation;* and the application to the legs of spongio-piline soaked in a strong infusion has been found to produce diuresis where other remedies have failed.

[[1] The investigations of Homolle demonstrated that the supposed active principle, digitalin, is a mixture of several compounds of which *digitoxin* is crystallizable, and is the most active constituent.]

Constitutional Action.

I. *Brain and Spinal Cord.*—On the brain no direct effect is produced, but the reflex irritability of the spinal cord seems to be somewhat lessened under the toxic action of the drug.

Stimulation of some portions of the vaso-motor and pneumogastric nerves seems to take place, as we shall explain more fully when treating of the influence of digitalis over the heart.

I. Although no direct action is produced on the brain tissue, it is reasonable to suppose that some alteration in cerebral function may follow the alterations in the vascular system produced by digitalis, and perhaps this may in part explain the remarkable results obtained by Mr. Jones, of Jersey, in the treatment of *delirium tremens* by the use of this drug. He found that half-ounce doses of the tincture quieted the delirium, reduced fever, and caused sleep. But this treatment can hardly be recommended, as several sudden deaths have been thus produced, and as it seems not improbable that the absence of toxic effects in many cases is due to the very partial absorption of the remedy.

II. *Heart and Circulation.*—Digitalis exerts a decidedly tonic and strengthening influence on the heart, rendering its beat slower and more forcible, and lengthening the period of systole. It therefore not only gives rest to the wearied organ, but also aids its nutrition by enabling the coronary arteries to do their work by supplying blood to the heart's muscle more efficiently during the prolonged diastolic pause. This result seems to depend

II. The undoubted effect of digitalis in slowing and strengthening the action of the heart would seem to indicate its use in certain diseased conditions of the organ, but it is only recently that this tonic influence has been recognized. In former years digitalis was looked upon as essentially a cardiac sedative, and was used to quiet the tumultuous palpitation of hypertrophy; but we now know that it may be prescribed with much greater success partly on a direct action on the heart's muscle itself, but also in some degree on stimulation of the cardiac inhibitory fibres of the vagus, which thus hold more forcibly in check the rapid rate of pulsation produced by the sympathetic nerves. If, however, the administration of the remedy be too long continued, exhaustion of the pneumogastric is apt to follow this overstimulation, and the heart, being now handed over to the unrestrained power of the vaso-motor nerve supply, runs riot in excessively rapid and feeble contractions.

The tonic influence of digitalis is attended by well-marked rise of arterial tension, and this is supposed to depend on stimulation of the sympathetic centres directly supplying the smaller vessels; and at the same time the heart is induced to act more powerfully, to overcome the increased resistance in front.

under the following circumstances:—

1. In *palpitation* and *irregular action of the heart*, whether depending on organic disease or not, an important indication for its use being intermittence, or the occurrence of frequent beats which do not reach the [radial] pulse.

2. In *mitral disease*, where the cardiac action is feeble, and apparently unable effectually to propel the blood, where lividity and dropsy are setting in, the lungs becoming engorged, and the right heart oppressed.

Here we shall derive the most signal service from digitalis given in moderate doses, and combined with a little iron. Dr. B. Foster ascribes some of the good effect of digitalis in mitral disease to its slowing action, giving more time for the auricle to empty itself fully of its contained blood.

The contracting effect of digitalis on the arterioles would naturally suggest its use in *hemorrhage*, and it has accordingly been found of service both in *hæmoptysis* and *menorrhagia*, although in neither is it so efficacious as ergot.

3. In *dilatation of the heart*, where the weak and thin muscle acts feebly and irregularly, giving rise to pal-

[illegible]

III. *Respiration and Temperature.*—On respiration no effect is produced, and although, in a state of health,

pitation and breathlessness, and causing temporary bruit, by unequal and ineffectual closure of the mitral and tricuspid valves.

4. In *aortic disease*, when compensation has not been made complete by hypertrophy.

In short, we may use digitalis whenever the heart is acting feebly and irregularly, but by its use we cannot expect to spur on a normally constituted heart with sound muscle to overcome difficulties in front, and we must avoid its regular use in the compensatory hypertrophy of aortic disease, and in *fatty degeneration*, where its tightening effect on the smaller vessels throws an injuriously-increased amount of work on the structurally-damaged organ.

5. Ringer has drawn attention to the beneficial action of the temporary use of digitalis in relieving the distressing attacks of *palpitation* so often due to hypertrophy of the heart.

6. Clifford Allbutt believes it to be the best remedy for aneurism, given in increasing doses, till the pulse comes down to 45, and continued as long as possible.

III. Digitalis has been found of great service in those cases of *bronchitis* which are so frequently associated with digitalis does not lower the body heat, it undoubtedly possesses this influence over febrile conditions; Wunderlich and others bringing ample evidence to prove its power of reducing temperature in pneumonia, enteric fever, acute rheumatism, and other acute disorders.

Binz holds that digitalis is no trustworthy antipyretic, as its action does not begin for thirty-six to sixty hours (Traube), and as it is uncertain and disturbs digestion.

IV. *Digestive and Secreting Organs.* — 1. *Stomach and Intestines.* — From its bitter taste, digitalis might be credited with some tonic properties; but it is really much more likely to disorder than to increase the appetite, by causing vomiting.

It does not seem to affect the intestinal tract in any way, save in the later stages of poisoning, when diarrhœa may supervene.

2. *Kidneys.*—Digitalis increases, under certain conditions, the flow of urine without altering in any essential respect the quantity or proportion of its solid ingredients. Its diuretic action depends partly on the tightening effect on the arterioles, rais-

a weak and dilated right heart, and where stimulation of the cardiac muscle leads to a better arrangement of circulation through the lungs.

For the reduction of temperature, digitalis is seldom used in this country, but in Germany its antipyretic virtues are prized. It seems, however, to lower the body-heat without influencing the course of the disease; and as it must be given in large doses, which may derange the digestive functions, even if they do not prove directly dangerous, there does not seem to be any real benefit following its employment.

2. Digitalis is a good diuretic, more especially in *cardiac* and *acute renal dropsy*, and acts best in combination with squill and mercury, as in the famous Guy's pill. The theory of this action, depending on heightened blood-pressure within the Malpighian

ing the blood-pressure in the renal glomeruli, and partly on the increased power and regularity of the heart, improving the general condition of circulation within the kidneys. One curious point in this connection is, that digitalis will seldom produce diuresis in healthy persons, but always acts best when dropsical accumulations have to be removed.

V. *Uterus.*—Digitalis, from its action on unstriped muscular fibre, has the property of stimulating the uterus to contraction.

tufts, explains the frequent failure of digitalis to augment the quantity of the urine in chronic kidney-disease, where the arterial tension is already high.

V. It has, therefore, been used to contract the uterus, and thus check flooding or *menorrhagia*, and it may also act by restoring its normal functions, when these are suspended, as in *amenorrhœa*.

CAUTIONS, MODE OF ADMINISTRATION, ETC.

In prescribing digitalis, we are generally advised to suspend its use from time to time, lest "accumulation" lead to poisonous symptoms; and experience must have shown us that, after its prolonged use, uncomfortable symptoms do arise. This may be due to elimination from the kidneys being prevented in some measure by the contracting influence of the drug on the renal arteries, as we find that so-called accumulation only takes place when urine is not passed freely.

It is advisable, whilst prescribing the drug, to examine the urine from time to time, so as to satisfy ourselves that the eliminating functions of the kidneys are being properly performed.

[The well-known variability in the activity of different specimens is due in some cases to falsification of the leaves, and in other cases to carelessness in gathering them. "Good digitalis must be collected when the plant is in full flower, selecting only the large lower and root leaves. The midribs of the larger leaves should be removed before using them."[1]]

[[1] Proc. Am. Phar. Assoc. 1881, p. 137.]

As regards the best form for its administration, the freshly made infusion is usually preferred.

℞.	Tinct. digitalis	♏x;	or	|65	Gm.	
	Spiritus æth. nitrosi	fʒss;	"	2	"	
	Inf. buchu	f℥j;	"	32	"	M.
S.	Ter in die.					

Recommended by Fothergill in *simple cardiac debility* with scanty flow of urine.

℞.	Pulv. digitalis	gr. xxx;	or	2	Gm.	
	Ferri sulph. exsic.	gr. xv;	"	1	"	
	Pulv. capsici	gr. xl;	"	2|60	"	
	Pil. aloës et myrrhæ	ʒij;	"	8	"	M.
	In pil. lx. div. Una bis in die.					

Recommended by Fothergill in *cardiac debility*, *gastric catarrh*, and *inactivity of the bowels*.

[The infusion may be combined with a diuretic in cardiac dropsy :—

℞.	Potassii acetatis	gr. xxx;	or	2	Gm.	
	Inf. digitalis	fʒij;	"	8	"	
	Aquæ q. s. ad	f℥ss;	"	16	"	M.

In *dropsy* due to *weak circulation*. To be taken every three or four hours.

When an alcoholic stimulant is required the compound spirit of juniper, or gin, may be added. Aortic disease is no contraindication, in such cases, to the use of digitalis.]

℞.	Tinct. ferri chloridi	♏xv;	or	1	Gm.	
	Glycerini	fʒj;	"	4	"	
	Infusi digitalis, Syrupi limonis, āā	fʒij;	"	8	"	
	Infusi calumbæ q.s. ad	f℥j;	"	32	"	M.
S.	Ter die sumend.					

The addition of phosphoric acid to this prescription would prevent the formation of tannate of iron.

Cardiac tonic.

[DULCAMARA—BITTERSWEET.

The young branches of Solanum Dulcamara, Linné (N. O. Solanaceæ).

OFFICINAL PREPARATION, U. S.

Extractum Dulcamaræ Fluidum. Dose, fʒss–ij (2. to 8. Gm.).

Dulcamara is a feeble narcotic, formerly recommended in *mania, rheumatism*, and *cutaneous diseases*. At present it is scarcely used in regular practice.]

ELATERINUM—ELATERINE.

[*A neutral principle extracted from Elaterium, a substance deposited by the juice of the fruit of Ecbalium Elaterium, A. Richard (N. O. Cucurbitaceæ).*

Trituratio Elaterini. Dose, gr. $\frac{1}{2}-\frac{1}{4}$ (.05 to .03 Gm.).]

Physiological Actions.

Elaterine produces irritation of the intestine, ending in inflammation where incautiously pushed, and causes the evacuation of large quantities of watery fluid. It purges equally powerfully when injected below the skin or taken by the mouth, but it is stated that solution in the bile is necessary to develop its full action. In some of the lower animals, peculiar nervous symptoms follow its use, and vomiting and great depression are liable to be produced in the human subject even by moderate doses.

Therapeutical Effects.

Elaterine is the most powerful hydragogue cathartic with which we are acquainted, and as such has been used to withdraw watery fluids from the intestines in various forms of *cardiac disease*, lightening the labors of the heart by lessening the volume of the blood, and relieving the cellular tissue and various cavities of dropsical accumulations. As, however, it is uncertain and very depressing in its action, it is now rarely used, in comparison with compound jalap powder, which seems to fulfil the same useful indications without an equal chance of seriously weakening the patient.

[**Elixiria.**

Elixir Aurantii (Simple Elixir) is the only officinal Elixir. It is composed of oil of orange, 1 part; sugar, 100 parts, with alcohol and water (1 to 3) to make 200 parts of filtrate. It is a pleasant vehicle.]

[Emplastra.

The officinal PLASTERS are—

Emplastrum Ammoniaci
" " cum Hydrargyro
" Arnicæ
" Asafœtidæ
" Belladonnæ
" Capsici
" Ferri
" Galbani
" Hydrargyri
Emplastrum Ichthyocollæ
" Opii
" Picis Burgundicæ
" " Canadensis
" " cum Cantharide
" Plumbi (Diachylon plaster)
" Resinæ
" Saponis.]

ERGOTA—ERGOT (ERGOT OF RYE).

[*The sclerotium of Claviceps purpurea, Tulasne* (*N. O. Fungi*), *replacing the grain of Secale cereale, Linné* (*N. O. Gramінaceæ*).

OFFICINAL PREPARATIONS, U. S.

Extractum Ergotæ Fluidum. Dose, ♏x–f℥ij (.65 to 8. Gm.).

Vinum Ergotæ (15 per cent.). Dose, f℥ss–iv (2. to 16. Gm.).

Extractum Ergotæ. Dose, gr. v–x (.30 to .65 Gm.)]

EXTERNAL ACTION.

Ergot has no local action.

INTERNAL ACTIONS.

Physiological.

1. *On Nervous System.*—No special action on any part of the nervous system has been proved save some anæmia of the nerve-centres caused by vascular contraction.

Therapeutical.

1. Dr. Brown-Séquard advises the use of ergot in some forms of *paraplegia*, unattended by irritation, and where inflammatory symptoms have subsided, believing that it acts well by contracting the dilated vessels. Dr. Crichton Browne has recently prescribed ergot with success in some forms of *chronic mania*. [It has been used

2. *On Vascular System.*—Ergot slightly depresses the action of the heart, and reduces the number of its pulsations, and it is said that the arterial tension is at first lowered in some slight degree. This effect, however, rapidly passes away, and a decided rise in arterial tension follows the contracting influence of the drug on the arterioles. On examining the web of an ergotized frog's foot, we may distinctly observe the gradual contraction of the smaller vessels up to absolute obliteration of their calibre; and this is believed to be due to a primary action of the ergot on their muscular walls rather than to the intervention of the vaso-motor system. Thus we observe a direct contrast to the action of the nitrite of amyl.

3. *Respiration and Temperature.*—No special action.

in whooping cough, with asserted good results.]

2. Ergot is now allowed to be by far the best astringent in cases of *internal hemorrhage*, and more especially in *menorrhagia*, *hæmoptysis*, and *epistaxis*, the use of the liquid extract having quite superseded the older treatment by means of acids (gallic acid and the like), whilst, if a more rapid action is required, we may subcutaneously inject ergotine. [It has also been injected into internal hemorrhoids with success.]

It is also a valuable remedy in *purpura*. Von Langenbeck, of Berlin, has advocated the injection of ergotine for the obliteration of *aneurismal sacs*, but sufficient evidence has not yet been brought forward of the success of this practice; and it has also been advised in the case of old *varicose veins*. The gangrenous form of ergotismus is doubtless due to arterial contraction cutting off the supplies of blood to the extremities. It has been highly praised by Da Costa in *diabetes insipidus*, and *albuminuria*.

Da Costa considers ergotine the most effectual remedy for the night sweating of *phthisis*.

4. *Urinary Functions.*—Ergot, from its specific action on unstriped muscular fibre, tends to contract the bladder, and, by raising the tension in the Malpighian bodies of the kidneys, it increases the urinary flow.	4. Ergot has been used successfully, and more especially when combined with iron, in that most troublesome affection, *incontinence of urine;* but in my own experience, belladonna is more deserving of confidence. Ergot has been recommended as a diuretic, and Langenbeck has much faith in subcutaneous injection of ergotine in the atony of the bladder and *enlarged prostate*, met with in the old.
5. *Digestive Organs.*—Ergot occasionally causes sickness, vomiting, and diarrhœa; but constipation is more likely to follow its use, from its contracting influence on the intestinal capillaries.	5. Ergot has been successfully prescribed in cases of *diarrhœa* and *dysentery*.
6. *Uterine Functions.*—Ergot has a remarkable and almost selective influence on the uterus, contracting its muscular walls, promoting its functions, and encouraging the expulsion of its contents.	6. Ergot acts as an ecbolic, expelling the contents of the uterus by causing contraction of its muscular walls. It must only be used, however, where no disproportion exists between the child and the maternal passages, and where we are prepared to render instrumental aid at once, if necessary, when the pains have been aroused. We must also remember that its prolonged use is apt to endanger the life of the child by cutting off its supply of blood through the placenta. Ergot is also of service in *flooding*, in reducing the size of hypertrophied or subinvoluted wombs, and in pro-

inducing the destruction of submucous polypi, either by cutting off their supply of blood, or by squeezing them out of the uterine cavity. It is also an excellent remedy for hæmorrhages and some forms of leucorrhœa.

MODE OF ADMINISTRATION. DANGERS. CAUTIONS.

In those countries where ergotized rye largely prevails, two forms of disease attend its use. 1. The gangrenous form of ergotismus, where extensive dry gangrene of the nose, face, and extremities supervenes; and, 2. The spasmodic variety, where the victim is afflicted with most violent and agonizing spasms. [It has been asserted that in those places where *ergotism* occurs, the general hygienic conditions are also at fault.] The therapeutic use of ergot, however, is of course never productive of any such symptoms, and the only inconvenience occasionally observed is some digestive derangement with colicky abdominal pain.

In addition to those named, the three following preparations are officinal in the British Pharmacopœia:—

Extractum ergotæ liquidum [Br.]. Dose, ♏x ad f℥ij (.65 to 8. Gm.). This is apt to be uncertain.

Infusum ergotæ [Br.]. Dose, f℥j ad f℥ij (32. to 64. Gm.).

Tinctura ergotæ [Br.]. Dose, ♏x ad f℥j (.60 to 4. Gm.).

The powder is also used in doses of from 20 to 30 grs., and many experienced authorities recommend a fresh infusion made with the powder and swallowed.

Ergotine [which is a purified extract of ergot] may be employed by subcutaneous injection, but this process has the drawback of causing a painful, black, and unsightly lump at the seat of puncture. Sclerotinic acid, however, which is the most active principle derived from ergot, may be conveniently used hypodermically. Dose, gr. $\frac{1}{2}$ to $\frac{3}{4}$ (.03 to .045 Gm.)

[Jaccoud (Moniteur de la Policlinique, No. 3, 1882) recommends the following formula:—

℞.	Ergotini	gr. xv ;	or	1 Gm.	
	Glycerini,				
	Aquæ dest., āā	fʒj ;	"	4	
	Aq. laurocerasi	♏xxx ;	"	2	M.

Of which 20–30 minims are to be injected from two to four times a day.

In *phthisical hæmoptysis.*

℞.	Ergotini	ʒij ;	or	8 Gm.	
	Chloralis	ʒss ;	"	2 "	
	Aquæ destillatæ	ʒvj.	"	24	M.

Inject 16 drops into the gluteal muscle.

A formula for subcutaneous injection recommended by Prof. Simpson.

℞.	Extracti ergotæ fluidi	fʒij ;	or	8 Gm.	
	Decocti aloës compositi [Br.] ad	f℥viij ;	"	"	M.

Fiat mistura, de quâ capiat unciam unam bis in die.

Useful in *amenorrhœa.*

℞.	Pulveris ergotæ	ʒj ;	or	4 Gm.
	Sacchari	ʒiv ;	"	16 "
	Aquæ bullientis	f℥iij ;	"	96 "

S. Capiat cochlearia duo magna quartâ quâque parte horæ ad effectum.

In a case of *labor.* [The wine of ergot and the fresh fluid extract in doses of ʒj–iv are also used in the second and third stages of labor.]

In a case of amenorrhœa from anæmia we may add a little ergot to any chalybeate mixture.

ERYTHROXYLON—ERYTHROXYLON (COCA).

[*The leaves of Erythroxylon Coca, Lamarck (N. O. Erythroxylaceæ.)*

OFFICINAL PREPARATION, U. S.

Extractum Erythroxyli Fluidum. Dose, ♏xv–ʒj (1 to 4 Gm.).]

The dried leaves of the coca plant, when chewed, are valued by some authorities as a nervine and muscular stimulant.

Cocainæ hydrochloras, the hydrochlorate of the alkaloid, has recently attained a high and well-deserved reputation as a local anæsthetic. When applied to the tongue it abolishes taste and tactile sensibility, and when a four per cent. solution is dropped into the eye it enables cataract operations, and those affecting the cornea alone, to be done painlessly, and materially reduces if it does not remove the pain of operation on the iris and the muscles of the eye as well as on the lachrymal apparatus.

"It appears to act essentially as a stimulant to the sympathetic system of nerves, in consequence of which it effects dilatation of the pupil, constriction of the bloodvessels, diminution of the intra-ocular tension, enlargement of the palpebral fissure, and protrusion of the eyeball." Its use also greatly facilitates laryngoscopic examinations and operations about the throat, as well as the uterus and bladder, and in supraorbital neuralgia it speedily relieves pain when dissolved in oil of cloves and rubbed gently over the affected spot. Lamellæ cocaniæ are made each containing $\frac{1}{200}$ gr.

[The "Cocaine habit," so called, has attracted some attention lately, owing to the sensational reports of persons who had become insane as the result of the excessive use of cocaine hypodermically. One physician in Chicago is said to have subjected himself and all the members of his family to these injections until becoming violently insane he was sent to a hospital. It is probably true that he was as proper a subject for such treatment at the time he commenced the use of the cocaine in this manner, as he was at the close; the excessive use of this or any other form of stimulant being itself an early manifestation of mental disease. Cocaine strongly resembles caffeine in its systemic effects and is proportionately scarcely more toxic.

Erythroxylon resembles tea in its action upon the nervous system as a stimulant and constructive. It is commonly used in combination with alcohol as a wine or cordial, as in the well known Vin Mariani and the Elixir Cocæ (native); the latter being made in South America from the recently dried leaves, it is believed to contain a volatile principle which is missing in the preparation made from the dried leaves after shipment. The fluid extract of coca, and alcoholic preparations are used during convalescence from acute diseases and as a tonic. Prof. Da Costa recommends cocaine as a cardiac stimulant in failing circulation and weak heart during typhoid fever in doses of gr. $\frac{1}{4}$ every two hours. Cocaine has been injected hypodermically to produce local anæsthesia during surgical operations.]

[EUCALYPTUS—EUCALYPTUS (BLUE GUM TREE).

The leaves of Eucalyptus Globulus Labillardière (N. O. Myrtaceæ), collected from rather old trees.

OFFICINAL PREPARATIONS.

Oleum Eucalypti. Dose, ♏ v–xx (.30 to 1.30 Gm.).

Extractum Eucalypti Fluidum. Dose, ♏ ij–xx (.20 to 1.30 Gm.).

LOCAL EFFECTS.

It has some antiseptic properties.

Aqua Eucalypti has been used as an application to ulcers, and for inhalation in *phthisis.*

CONSTITUTIONAL.

It increases the quantity of blood sent to the brain, and in large doses causes cerebral congestion.

The heart becomes more rapid in its action, and blood pressure is reduced.

Small doses promote appetite and digestion by stimulating the salivary and peptic glands; they also increase the intestinal secretions. Large doses cause vomiting, diarrhœa, indigestion, and muscular prostration.

It is an expectorant, and large doses cause death by respiratory failure.

The volatile oil is thrown off by the kidneys, bronchial mucous membrane, and the skin.

In *nervousness, hysteria,* and *chorea,* the volatile oil of Eucalyptus acts as a stimulant. In *malarial manifestations* it can take the place of cinchona when the latter has to be discontinued.

In convalescence from acute diseases, in *atonic dyspepsia,* and *intestinal catarrh,* and disorders of digestion.

In *bronchitis* and *bronchorrhœa* it may be administered internally or used by inhalation with steam atomizer. In *asthma,* Eucalyptus may be mixed with belladonna, or stramonium leaves, and cigarettes made, to be burned and the smoke inhaled.

The water of Eucalyptus (not off.) is used as a vehicle for dissolving alkaloids for hypodermic use, to prevent the development of germs of decomposition.]

EUONYMUS—EUONYMUS (WAHOO).

[*The bark of Euonymus Atropurpureus, Jaquin* (*N. O. Celastraceæ*).

OFFICINAL PREPARATION.

Extractum Euonymi. Dose, gr. ij to v (.13 to 32 Gm.).]

Wahoo is cathartic, resembling rhubarb in its action, and has decided cholagogue effects. The preparation known as Euonymin is a powerful hepatic, but a feeble intestinal, stimulant, in doses of gr. ss–v. [Consists of resin and fixed oil, together with the peculiar bitter active principle, which has also received the name of Euonymin.]

[EUPATORIUM—THOROUGHWORT.

The leaves and flowering tops of Eupatorium perfoliatum, Linné (*N. O. Compositæ*).

OFFICINAL PREPARATION, U. S.

Extractum Eupatorii Fluidum. Dose, ʒss–j (2 to 4 Gm.).

Thoroughwort (Indian Sage, or Boneset) is a bitter tonic and sudorific, and in large doses produces vomiting and purging. The hot infusion has been largely given for "*colds*," *muscular rheumatism*, and *catarrh*. The infusion is emetic in doses of a pint. Dose of the powder as a tonic, in *dyspepsia*, gr. xx–xxx (1.30 to 2. Gm.).]

[Extracta.

THE officinal EXTRACTS are—

Extractum Aconiti
“ “ Fluidum
“ Aloës Aquosum
“ Arnicæ Radicis
“ “ “ Fluidum
“ Aromaticum Fluidum
“ Aurantii Amari Fluidum
“ Belladonnæ Alcoholicum
“ “ Fluidum
“ Brayeræ Fluidum
“ Buchu Fluidum
“ Calami Fluidum
“ Calumbæ Fluidum
“ Cannabis Indicæ
“ “ “ Fluidum
“ Capsici Fluidum
“ Castaneæ Fluidum
“ Chimaphilæ Fluidum
“ Chiratæ Fluidum
“ Cimicifugæ Fluidum
“ Cinchonæ
“ “ Fluidum
“ Colchici Radicis
“ “ “ Fluidum
“ “ Seminis Fluid.
“ Colocynthidis
“ “ Compositum
“ Conii Alcoholicum
“ “ Fluidum
“ Cornûs Fluidum
“ Cubebæ Fluidum
“ Cypripedii Fluidum
“ Digitalis
“ “ Fluidum
“ Dulcamaræ Fluidum
“ Ergotæ
“ “ Fluidum
“ Erythroxyli Fluidum
“ Eucalypti Fluidum
“ Euonymi
“ Eupatorii Fluidum
“ Frangulæ Fluidum
“ Gelsemii Fluidum
“ Gentianæ
“ “ Fluidum
“ Geranii Fluidum
“ Glycyrrhizæ
“ “ Fluidum

Extractum Glycyrrhizæ Purum
“ Gossypii Radicis Fluid.
“ Grindeliæ Fluidum
“ Guaranæ Fluidum
“ Hæmatoxyli
“ Hamamelidis Fluidum
“ Hydrastis Fluidum
“ Hyoscyami Alcoholicum
“ Hyoscyami Fluidum
“ Ipecacuanhæ Fluidum
“ Iridis
“ “ Fluidum
“ Juglandis
“ Krameriæ
“ “ Fluidum
“ Lactucarii Fluidum
“ Leptandræ
“ “ Fluidum
“ Lobeliæ Fluidum
“ Lupulinæ Fluidum
“ Malti
“ Matico Fluidum
“ Mezerei
“ “ Fluidum
“ Nucis Vomicæ
“ “ “ Fluidum
“ Opii
“ Pareiræ Fluidum
“ Physostigmatis
“ Pilocarpi Fluidum
“ Podophylli
“ “ Fluidum
“ Pruni Virginianæ Fluid.
“ Quassiæ
“ “ Fluidum
“ Rhei
“ “ Fluidum
“ Rhois Glabræ Fluidum
“ Rosæ Fluidum
“ Rubi Fluidum
“ Rumicis Fluidum
“ Sabinæ Fluidum
“ Sanguinariæ Fluidum
“ Sarsaparillæ Compositum Fluidum
“ Sarsaparillæ Fluidum
“ Scillæ Fluidum
“ Scutellariæ Fluidum

Extractum Senegæ Fluidum
" Sennæ Fluidum
" Serpentariæ Fluidum
" Stillingiæ Fluidum
" Stramonii
" " Fluidum
" Taraxaci
" " Fluidum
Extractum Tritici Fluidum
" Uvæ Ursi Fluidum
" Valerianæ Fluidum
" Veratri Viridis Fluidum
" Viburni Fluidum
" Xanthoxyli Fluidum
" Zingiberis Fluidum.]

[FEL BOVIS—OX-GALL.

The fresh gall of Bos Taurus, Linné (Class Mammalia, Order Ruminantiæ).

Officinal Preparations, U. S.

Fel Bovis Inspissatum. Dose, gr. x (.65 Gm.).
Fel Bovis Purificatum. Dose, gr. v–x (.30 to .65 Gm.).

Ox-gall is mildly antiseptic and laxative, assisting in the digestion and absorption of fats. It may be given in habitual constipation, accompanied by clay-colored, fecal discharges, but is little used.]

FERRUM—IRON.

[*Metallic Iron in the form of fine bright non-elastic wire.*
(Fe = 55.9.)

Ferrum Reductum (reduced Iron, Quevenne's iron). Dose, gr. ij (.13 Gm.).

Officinal Preparations, U. S.

Ferri Carbonas Saccharatus (at least 15 per cent. Ferrous Carbonate). Dose, v–xx (.30 to 1.30 Gm.).

Ferri Iodidum Saccharatum (at least 20 per cent. Ferrous Iodide). Dose, gr. iij–x (.20 to .65 Gm.).

Ferri Chloridum. Dose, gr. j–x (.06 to .65 Gm.). Also locally as a styptic.

Liquor Ferri Chloridi. Dose, ♏ij to x (.13 to .65 Gm.). Used in making the Tincture.

Tinctura Ferri Chloridi. Dose, ♏x–xl (.65 to 2.60 Gm.).

Ferri Citras. Dose, gr. v–xx (.30 to 1.30 Gm.).

Liquor Ferri Citratis (35.5 per cent. of anhydrous salt). Dose, ♏ x–xl (.65 to 2.60 Gm.).

Ferri et Ammonii Citras. Dose, gr. v–x (.30 to .65 Gm.).

Vinum Ferri Citratis (4 per cent.). Dose, ʒj–ʒiv (.4 to .16 Gm.).

Ferri et Ammonii Sulphas. Dose, gr. iij–xij (.20 to .75 Gm.).

Ferri et Ammonii Tartras. Dose, gr. x–xxx (.65 to 2. Gm.).

Ferri et Potassii Tartras. Dose, gr. x–xxx (.65 to 2. Gm.).

Ferri et Quininæ Citras. Dose, gr. v–xv (.30 to 1. Gm.).

Liquor Ferri et Quininæ Citratis (Quinine six per cent.).

Vinum Ferri Amarum (8 per cent. of Liquor Ferri et Quininæ Citratis). Dose, ʒj to ℥j.

Ferri et Strychninæ Citras (Strychnine 1 per cent.). Dose, gr. iij–v (.20 to .30 Gm.).

Syrupus Ferri, Quininæ et Strychninæ Phosphatum. Dose, ʒj (.4 Gm.).

Ferri Lactas. Dose, gr. ij–x (.12 to .65 Gm.).

Syrupus Hypophosphitum cum Ferro (1 per cent. Ferri Lactas).

Ferri Oxalas. Dose, gr. ij–v (.12 to .30 Gm.).

Ferri Oxidum Hydratum. Dose, gr. v (.30 Gm.). (As an antidote, gr. xx for each grain of arsenious acid.)

Ferri Oxidum Hydratum cum Magnesia. (Antidotum Arsenici, P. G.) Dose, as above.

Liquor Ferri Acetatis (33 per cent. of anhydrous salt). Used in making:—

Tinctura Ferri Acetatis (16½ per cent. of anhydrous salt). Dose, ♏ xv–xxx (1. to 2. Gm.).

Ferri Phosphas. Dose, gr. v–x (.30 to .65 Gm.).

Ferri Pyrophosphas. Dose, gr. ij–vj (.12 to .40 Gm.).

Ferri Hypophosphis. Dose, gr. v–xx (.30 to 1.30 Gm.).

Ferri Valerianas. Dose, gr. j–iij (.06 to .20 Gm.).

Emplastrum Ferri (Ferrum Oxidum 10 per cent.).

Trochisci Ferri. (Each gr. v of oxide of iron).

Ferri Sulphas. Dose, gr. i–v (.06 to .30 Gm.).

Ferri Sulphas Exsiccatus. Dose, gr. i–ij (.06 to .13 Gm.).

Ferri Sulphas Præcipitatus. Dose, gr. j–ij (.06 to .13 Gm.).

Mistura Ferri Composita. Dose, f℥ss (.16 Gm.).

Massa Ferri Carbonatis (Vallet's Mass). Dose, gr. x–xx (.65 to 1.30 Gm.).

Pilulæ Ferri Compositæ. Dose, 2 to 6 pills.

Pilulæ Ferri Iodidi (each contains gr. j of Ferrous Iodide). Dose, 1 or 2 pills.

Syrupus Ferri Iodidi (10 per cent.). Dose, ♏x–xl (.65 to 2.60 Gm.).

Syrupus Ferri Bromidi (10 per cent.). Dose, ʒss–j (2. to 4. Gm.).

Liquor Ferri Nitratis (6 per cent.). Dose, ♏x–xx (.65 to 1.30 Gm.).

Liquor Ferri Subsulphatis (43.7 per cent. of basic Ferric Sulphate). (Monsel's Solution.) Dose, ♏ij–x (.12 to .65 Gm.).

Liquor Ferri Tersulphatis (28.7 per cent. normal Ferric Sulphate). (Used to prepare hydrated sesquioxide of iron).

Mistura Ferri et Ammonii Acetatis (see AMMONIA). (Basham's Mixture.) Dose, ℥ss (16 Gm.).

Pilulæ Aloes et Ferri (1 grain of each). See ALOES.

Iron is also used in preparing Potassii Bromidum, Ammonii Bromidum, and Ferri Bromidum (officinal only in the form of the syrup).]

LOCAL EFFECTS.

Physiological.	*Therapeutical.*
Certain of the stronger preparations of iron are very astringent, corrugating and hardening the tissues by coagulating their albumen; and also contracting the smaller bloodvessels.	In the form of the perchloride [chloride], iron is one of our most generally used astringents for the arrest of *hemorrhage*, as in *epistaxis*, *leech-bites*, in *flooding* (injected into the uterus, as advised by Dr. Barnes), or, in fact, in any variety of passive hemorrhage.

It is also a valuable application to relaxed mucous membranes; thus, in many forms of *sore throat*, equal parts of tinct. ferri and glycerine will act well. It forms a good injection for *leucorrhœa*, and is extensively employed as an enema for the destruction of *thread worms*. Velpeau recommended the application of a strong solution of sulphate of iron to the inflamed skin in *erysipelas*, and Ricord considers that tartrate of iron has an almost specific influence over the destructive ulcerative process of *syphilitic phagedæna*.

INTERNAL ACTIONS AND USES.

Physiological.	*Therapeutical.*
1. *Brain and Nervous System.*—Iron has a tonic influence over the nervous system, but occasionally, in plethoric persons, the stronger preparations will cause an uncomfortable sensation of fulness and throbbing in the head.	1. Iron is much used as a tonic in all conditions of *nervous exhaustion* and debility. Thus, in *neuralgia*, which consists in a weakened state of the roots of certain sensory nerves, it is invaluable. In *chorea*, which generally coincides with debility, and in all cases depending in any way on want of nerve-tone, it is a remedy of real value. As originally pointed out by Brown-Séquard and confirmed by Hughlings-Jackson, iron does not agree with epileptics, increasing the tendency to fits. Gowers, who has carefully investigated this

2. *Circulation and Respiration.*—Iron acts as a tonic to the muscular structures of the heart, probably by supplying the stimulus of a larger supply of healthy blood.

Iron is held to increase the plasticity of the blood and to increase the red corpuscles by passing into and stimulating the lymphatic system and encouraging the transformation of the lymph globules. Recent researches have shown that no effect of this nature is produced on healthy blood, but that in anæmia the number of red corpuscles is very rapidly increased under the use of iron as the primary effect, without a proportionate rise in the hæmaglobin which they contain; as a secondary result, however, the hæmaglobin also is increased and the number of globules may then even diminish.

point, shows that it makes many cases worse, has no influence on others, but that a third class, on the border line between epilepsy and hysteria, may even derive benefit from the action of iron as a nervine tonic.

2. This increase in the red corpuscles of the blood, and, as a consequence, in the extent to which these important bodies carry out their function of bearing oxygen to the tissues and finally converting it into ozone, explains further the marvellous tonic influence of iron. The benefit in anæmia very quickly follows this actual numerical increase, as indicated by Gowers's ingenious and practical modification of Malassez-Hayems's method for microscopical proof of the augmented number by careful daily counting. In *anæmia*, in protracted convalescence from acute disease, in general feebleness or debility, in *chlorosis*, where it also acts by giving increased tone to the uterine functions, in *struma*, *rickets*, *secondary syphilis*, etc., iron forms the basis of every method of treatment. Grainger Stewart praises the use of the tincture of iron in the *cerebral anæmia*, *giddiness*, and *headache* so often met with in valvular disease, more especially of the aorta.

3. *On Secreting Organs.*—On the stomach, iron acts by bracing up the mucous membrane, and improving the appetite and digestive tone.

3. Here we have another explanation of its tonic properties.

Its astringency tends to cause constipation.

This action is utilized in the treatment of *diarrhœa*, where some of the more astringent preparations, as the nitrate, are often of service.

Urine.—Iron increases the amount of urea given off by the urine, and occasionally irritates the bladder, causing frequency of micturition.

[In ordinary tonic doses, the tincture of the chloride relieves *vesical irritability*, *strangury*, and *spasmodic stricture;* and is much used in *gleet* and *chronic Bright's disease.*]

4. *On Temperature.*—Iron raises the temperature partly by increasing the waste of the tissues, but partly also in virtue of its ozonizing properties.

SPECIFIC ACTION.

Iron has a very marked influence in checking *erysipelas*, which must be called specific. We here use the tincture of the perchloride [chloride], and give it in doses of from fʒss to fʒj every three or four hours. It is also of service in *diphtheria;* and Dr. Russell Reynolds has lately brought the evidence of over sixty cases to show that in *acute rheumatism*, given in large doses, it rapidly diminishes the pain and fever.

MODE OF ABSORPTION AND ELIMINATION.

The more soluble forms of iron are readily absorbed, and become combined as albuminates with the albumen of the blood, whilst the solid preparations must first undergo solution in the gastric juice. When they have played their part within the organism, they are thrown out principally by the fæces, to which they impart a blackish color, but also in some measure by the pigment of the urine, the skin, hair, nails, urine, and by albuminous secretions, such as those of the bile, by all mucous and serous membranes.

MODES OF ADMINISTRATION. DRAWBACKS.

We have seen that various inconveniences may attend the use of iron, such as headache, irritability of bladder, constipation, nausea, etc., and it further has the disadvantage of blackening the tongue and teeth; but many of these evils may be avoided by using the lighter or less astringent preparations, such as the citrate of quinine and iron, wine or saccharated carbonate; or by combining with some aperient, and by giving each dose after a meal. The dyspepsia and hepatic congestion occasionally following the use of the tincture in large doses may best be alleviated by adding one grain of the chloride of ammonium to each minim (Grainger Stewart).

But if no contraindication exists, there is no doubt that the astringent properties of the per-salts of iron stand us in good stead, and, in particular, no preparation is so useful on the whole as the old muriated tincture. In *secondary syphilis*, the syrup of the iodide is of service, and children will always take steel wine or the saccharated carbonate well; whilst in cases of *chlorosis* with disordered menstrual function we shall find the mist. ferri composita to be very efficacious in improving the quality of the blood and gently stimulating the uterus to resume its neglected duties. The sulphate of iron has some influence in aiding the action of some purgative salts, as the sulphate of magnesia.

The preparations of iron are so very numerous that no one but a student on the very brink of an examination would think of burdening his memory with them all; and we shall only refer, therefore, to those which form part of the daily stock-in-trade of the practical physician.

Dialysed iron (liquor ferri dialysatus) has recently come into fashion, and is said to be effective and well borne as a tonic in dose of ♏ v–xx, whilst we are told that it is a good and readily procurable antidote in cases of arsenical poisoning.

Vinum ferri amarum may be given in doses of from fʒj to f℥j; mistura ferri aromatica [Br.] f℥j ad f℥ij; mistura ferri composita f℥ss ad f℥ij; ferri carbonas saccharatus gr. v ad ʒj; syrupus ferri iodidi ♏x ad fʒj; ferri et ammonii citras gr. v ad x; ferri et quininæ citras gr. v ad xx. Or in combination—

℞.	Tincturæ ferri chloridi		♏x;	or		65	Gm.	
	Spiritus chloroformi		♏xv;	"	1		"	
	Glycerini		fʒss;	"	2		"	
	Infusi calumbæ	q. s. ad	f℥j;	"	32		"	M.

S. Ter die sumend.

Chalybeate mixture.

℞.	Misturæ ferri compositæ,				
	Decocti aloes compositi, [Br.] āā f℥jss	or	16.	Gm.	M.

S. Fiat haustus ter die sumendus.

℞.	Magnesii sulphatis		℥ij;	or	64		Gm.	
	Ferri sulphatis		gr. xxiv;	"	1	60	"	
	Acidi sulphurici diluti		fʒij;	"	8		"	
	Infusi calumbæ	q. s. ad	f℥viij;	"	256		"	

S. Capiat cochlearia duo magna omni mane.

Ferruginous aperient.

Iron, as a rule, is best taken after a meal, but we must warn our patient to avoid the neighborhood of tea, as the mixture of these two ingredients forms a species of ink, which is both nauseous and unsightly. As the more astringent preparations not only stain but injure the teeth, they may be conveniently sucked through a glass tube.

FICUS—FIG.

[*The fleshy receptacle of Ficus Carica, Linné (N. O. Urticaceæ, Artocarpeæ), bearing fruit upon its inner surface.*

Figs are slightly laxative, and enter into Confectio Sennæ.]

[FŒNICULUM—FENNEL.

The fruit of Fœniculum Vulgare, Gærtner (N. O. Umbelliferæ, Orthospermæ).

OFFICINAL PREPARATIONS, U. S.

Oleum Fœniculi. Dose ♏v–xv (.30 to 1. Gm.).

Aqua Fœniculi. As a vehicle.

Also enters into Infusum Sennæ Compositum, Pulv. Glycyrrhizæ Compositus and Spiritus Juniperus Compositus.

Often used in infusion as an aromatic carminative for *flatulent colic* in infants.]

FRANGULA—FRANGULA. BUCKTHORN.

(The bark of Rhamnus Frangula, Linné. Nat. Ord. Rhamnaceæ, collected at least one year before being used.)

OFFICINAL PREPARATION, U. S.

Extractum Frangulæ Fluidum. Dose, ʒss–ij (2 to 8 Gm.).

[A purgative resembling senna; the fluid extract is the best form for administration, and may be combined with aromatics.]

GALBANUM—GALBANUM.

(A gum-resin from Ferula galbaniflua, Boissier et Buhse, and probably from other species of Ferula. Nat. Ord. Umbelliferæ.)

Dose, in substance, gr. x–xx (.65 to 1.30 Gm.).

OFFICINAL PREPARATIONS.

Emplastrum Galbani (Galbanum 16 parts, containing [illegible] turpentine, Burgundy pitch and lead plaster).

Emplastrum Asafœtidæ (Asafetida 35, galbanum [illegible]).

Pilulæ Galbani Compositæ (each, galbanum, gr. jss; myrrh, gr. jss; asafetida, gr. ss).

[Galbanum and ammoniacum are substances of no special therapeutical value, but are usually classed as expectorants, antispasmodics, and stimulants.]

GALLA—NUTGALL.

(*Excrescences on Quercus Lusitanica, Webb, Variety infectoria, De Candolle (N. O. Cupuliferæ) caused by the punctures and deposited ova of Cynips Gallæ Tinctoriæ, Olivier (Class Insecta, Ord. Hymenoptera).*)

OFFICINAL PREPARATIONS, U. S.

Tinctura Gallæ (20 per cent.). Dose, ʒss–ij (2 to 8 Gm.).

Unguentum Gallæ (10 per cent.).

Acidum Gallicum. Dose, gr. v–xx (.30 to 1.30 Gm.).

Unguentum Acidi Gallicæ (10 per cent. with benzoinated lard).

Acidum Tannicum. Dose, gr. j–iv (.06 to .25 Gm.).

Unguentum Acidi Tannici (10 per cent.).

Trochisci Acidi Tannici (each gr. j).

Galls contain about 50 per cent. of tannic acid, which is chemically an anhydride of gallic acid, and yields gallic acid by maceration in water. Their action can be best studied as tannic acid, to which their astringency is due.]

External Action.

Physiological.

Tannic acid has a powerful local astringent action, owing partly, no doubt, to its power of coagulating albumen, and "tanning," in some degree, any part to which it may be applied.

Therapeutic.

Tannic acid is a better topical astringent than gallic, and may be used to arrest *hemorrhage*, or *diarrhœa*, or as an injection for *gonorrhœa* and *leucorrhœa*. Combined with glycerine, in the form of the glycerite of tannin, it is very useful as an application in various forms of *sore throat*, and to arrest the discharge in some chronic affections of the os uteri, in the chronic-weeping stage of *eczema*, in *ozœna*, and *chronic otorrhœa*. It may also soothe and restrain some of those irritable coughs which depend on chronic irritation about the pharynx. Galls are used, in the form of ointment, as an application to hæmorrhoids.

Internal Action.

Tannic and gallic acids are both powerful astringents, but as tannic acid is rapidly converted in the system into

Tannic acid is rarely used internally, but gallic acid is serviceable in various forms of hemorrhage, such as *hæ-*

gallic acid, it is preferable to use the latter. This conviction is proved by the fact that if we take the urine of a patient to whom tannic acid has been given, we find that it will not precipitate gelatine, but that it strikes a blackish tint with the persalts of iron. *moptysis*, *hæmatemesis*, and *menorrhagia*; but in all of these it must yield the palm to ergot, and it is more especially in hemorrhage from the kidney that its curative action comes into play. It has also been used with success to check the excretion of albumen in chronic *renal disease.*

℞.	Acidi gallici	ʒj;	or	4	Gm.	
	Glycerini	f℥ss;	"	16	"	
	Aquæ destillatæ	f℥vj;	"	192	"	M.

S. f℥j ter die, or, better, every three hours, as the acid is very rapidly eliminated unchanged by the urine.

[As tannin in the usual form of solution or in substance is only slowly absorbed by the mucous membrane of the intestinal tract, Dr. Lewin[1] recommends its administration in solution in the form of an albuminate, which tastes better and is more easily absorbed; thus he uses :—

℞.	Acidi tannici	2	Gm.	
	Aquæ	100	"	
Misce, agitando, et adde—				
	Sol. album. ovi unius	10	"	M.

The quantity of the albumen must, if necessary, be increased so as to correspond with the tannic acid.

For a long-continued administration, the following is better :—

℞.	Acid. tannici	2 to 5	Gm.
	Aquæ destillatæ	100	"

Misce et adde—
Album. ovi unius.
Solutio sodii bicarb. q. s. ut ft. solutio limpida. M.

Or, simply :—

℞.	Acidi tannici	1 to 5	Gm.
	Aquæ	150	"

Solutio sodii bicarb. q. s. ad react. alkalin. M.

Which should be kept well corked, and not used until it has stood 24–48 hours.]

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[1] Deutsche Med. Woch. No. 6, 1881.

[GAULTHERIA—PARTRIDGE-BERRY.

The leaves of Gaultheria procumbens, Linné (N. O. Ericaceæ).

OFFICINAL PREPARATIONS, U. S.

Oleum Gaultheriæ. Used for flavoring.
Spiritus Gaultheriæ. " "

Used in Syrupus Sarsaparillæ Compositus, and Trochisci Morphinæ et Ipecacuanhæ.

Winter-green, or tea-berry, is an aromatic astringent tonic, but is chiefly used as a flavoring addition to mixtures.]

Oil of winter-green is an excellent remedy in acute rheumatism, and is said to possess the virtues of salicylic acid without its drawbacks, being prompt, efficient and agreeable, and under its use relapses are less common. It is also of service in chronic cases, and as a topical application. Large and frequent doses must be given—♏x in an emulsion with glycerine and water [or simply dropped on sugar].

GELSEMIUM—GELSEMIUM (YELLOW JASMINE).

[*The rhizome and rootlets of Gelsemium sempervirens, Aiton (N. O. Loganiaceæ.)*

OFFICINAL PREPARATIONS, U. S.

Extractum Gelsemii Fluidum. Dose, gtt. ♏ij–x (.13 to .65 Gm.).

Tinctura Gelsemii (15 per cent.). Dose, ♏v–xx (.32 to 1.30 Gm.).

An alkaloid, gelsemina, exists in the root; in combination with gelsiminic acid.]

CONSTITUTIONAL ACTION.

Physiological.	*Therapeutical.*
1. *Brain and Nervous System.*—Moderate doses produce redness of the conjunctiva, pain in the eye-lids, contraction of pupils followed by	1. Gelsemium has been prescribed with success in *neuralgia* of the fifth nerve, *intercostal* and *ovarian neuralgia*, and *myalgia*.

slight ptosis, whilst large doses of gelsemium cause vertigo and double vision. [The cerebral effects are explained by the accumulation of carbonic acid in the blood secondary to respiratory paralysis, by Bartholow.] A paralyzing influence is exerted on the spinal cord, the power of voluntary movement being finally quite abolished, numbness and staggering being preliminary symptoms. Reflex irritability is also suspended, the pupil dilates, and at a later stage the sensory columns of the cord are also paralyzed, producing complete anæsthesia (Bartholow). The first nerve affected is the 6th at its termination, causing paralysis of the external rectus, and later on the 3d is also attacked. A curious point about its action is, that when taken internally it contracts the pupil, whereas on topical application, rapid and full dilatation is produced, being complete in from 50 to 70 minutes. One advantage which it undoubtedly has over atropine, in addition to the swiftness of its effects, is, that the resulting diminution of accommodation for near objects is never so well marked, and passes away partially in 10 or 15, and absolutely in 30 hours.

Ringer tells us that large doses of the alkaloid [gel-

Dr. Spencer Thompson has treated 40 cases of neuralgia successfully by gelsemium, pointing out, however, that its beneficial action is confined to affections of the trifacial nerve, and more especially to the branches supplying the upper and lower jaw, and particularly the latter, and that the dose must be ♏xx of the tincture, repeated, if necessary, in 1½ hours.

[In other disorders of the cutaneous nerves, as in *prurigo*, gelsemium has been successfully applied in dilute solution; and it has been recommended also for *rhus poisoning*.

℞. Acid. carbol. fʒss, or 2 | Gm.
Ext. gelsem. fld. fʒij; " 8 |
Glycerinæ, f℥ss, or 16 |
Aquæ, f℥ij; " 64 |
M. Sig. For local application.

(Dr. Edson, *Medical Record*, July 29, 1882.)]

This would indicate a certain advantage in ophthalmoscopic examinations over atropine, which causes much annoyance to hard-worked people by impairing vision for a week or ten days after use.

It has been recommended as a remedy for *tetanus*.

semine, of which gr. $\frac{1}{6}$ has caused death] at first paralyze, and then excite tetanus, which in a short time gives way to paralysis.

2. *Heart and Circulation.*—A slightly weakening effect on the heart is noted. [This is explained by Ott on the view that it diminishes the pulse-rate by lessening the irritability of the excito-motor ganglia of the heart, and the arterial pressure by diminishing cardiac irritability and vaso-motor tonus.]

3. *Respiration and Temperature.*—The respirations become labored, shallow, and irregular, from diaphragmatic paralysis, death ensuing from asphyxia. The temperature falls, probably in consequence of the profuse perspiration which it induces.

3. Bartholow recommends gelsemium in various forms of convulsive or *spasmodic cough*, and in acute inflammations of the lungs and pleura he thinks it may do good by diminishing the activity of the respiratory functions.

Dose, etc.

We may give the tincture every three hours, until drooping of the eyelid, dilatation of the pupil, and muscular languor are noted. But, remembering that some persons are peculiarly susceptible to its physiological action, we must begin one dose cautiously, from two to three minims, gradually increasing up to twenty or thirty. The dose of the alcoholic extract (not off.) is one-half to two grains. [In the treatment of poisoning by gelsemium, hypodermic injections of morphine and atropine, and the use of ammonia, and diffusible stimulants are necessary, with hot applications and frictions to the extremities.]

GENTIANA—GENTIAN.

[*The root of Gentiana lutea, Linné (N. O. Gentianaceæ).*

Officinal Preparations, U. S.

Extractum Gentianæ. Dose, gr. ij–iv (.12 to .25 Gm.).

Extractum Gentianæ Fluidum. Dose, ♏x–xxx (.65 to 2. Gm.).

Tinctura Gentianæ Composita (gentian 8, bitter orange peel 4, cardamom 2, dilute alcohol 100). Dose, fʒj–iv (4. to 16. Gm.).

Gentian is the type of the simple bitters, and is largely employed in cases where a tonic of this kind is indicated. As it contains no astringent element, it may readily be exhibited in combination with iron.]

Gentian and chiretta may be grouped together, as their action is almost precisely similar. They are both light, agreeable tonics, with pleasant, aromatic, bitter flavor, and may be used freely in *dyspepsia* and *debility* with loss of appetite. Gentian has always, however, been much more generally employed than chiretta, and this may be partly due to the very agreeable compound preparations of the former drug.

[GERANIUM—CRANESBILL.

The rhizome of Geranium maculatum, Linné (N. O. Geraniaceæ).

Officinal Preparation, U. S.

Extractum Geranii Fluidum. Dose, fʒss–j (2. to 4. Gm.).

Crowfoot, or cranesbill, is an indigenous astringent tonic, containing tannic and gallic acids, and may be used with advantage in *bowel complaints*, and as a styptic. A decoction in milk is sometimes given to children.]

GLYCERINUM—GLYCERIN.

[*A liquid obtained by the decomposition of fats or fixed oils, and containing not less than 95 per cent. of absolute Glycerin* [$C_3\ H_5(HO)_3$].

Officinal Preparations, U. S.

Glyceritum Amyli (starch 10, glycerin 90). Externally used.

Glyceritum Vitelli (fresh yolk of egg 45, glycerin 55). Externally used.

Mucilago Tragacanthae (tragacanth 6, glycerin 18, water q. s. to make 100).

Used also in preparing the officinal Extracta Fluida.]

This useful substance is almost exclusively used externally. It moistens and softens the skin, and when properly diluted both prevents and cures the painful and unsightly cracks known as "chaps" on the hands. It is a serviceable application, either alone or combined with other drugs, in various forms of skin disease.

It may soothe an irritable cough by moistening the dryness of the throat, and it is stated to be the most efficient means at our command for the prevention of bedsores; being mildly laxative, it has been recommended in piles. In addition to this, it forms an excellent vehicle for the solution of various drugs, as seen in the glycerites of the Pharmacopœia, having this additional advantage, that its adhesive nature enables the active ingredient to remain longer than it otherwise would in contact with the affected surface. It is also a good solvent of the alkaloids, dissolving them freely, and, being decidedly antiseptic, it is now used for preservation of vaccine lymph.

Some remarkable experiments have been recently made regarding the physiological action of glycerin. MM. Dujardin-Beaumetz and Audige, working in Vulpian's laboratory, found that by hypodermic injection it causes tetanic rigidity resembling that caused by strychnine, with rise of temperature, hæmaturia, and meningeal injection; and M. Cattillon found that internally it increased the appetite, promoted nutrition, and lessened the excretion of urea. It would therefore seem to be a good nutrient, although unfortunately of no use in diabetes. [Recently glycerin has found favor as an enema in the treatment of *constipation*. Glycerin supposi-

tories with white soap (50 per cent. glycerin) are
used.]

INTERNAL USE.

It was thought at one time that glycerin might prove
agreeable and efficient substitute for cod-liver oil; but
has not been confirmed, and glycerin is now seldom
internally. [It has been found of special value in the tr
ment of *Trichinosis*. Dose, ʒij–iv. It has been hig
commended as a substitute for sugar in the diet of diab
patients. It may be given as a laxative to children. W
used internally only the purest kind should be used;
made from vegetable fats is considered preferable on
account.]

Boro-Glyceride [a 50 per cent. solution of boric
in glycerin] has been recommended by Barwell as an
septic in surgical manipulations and dressing.

Soak lint in a solution of 1 in 20.

GLYCYRRHIZA—LICORICE.

The root of Glycyrrhiza glabra (N. O. Leguminosæ, Papilionacea

Enters into the manufacture of Decoctum Sarsapa
Compositum, Extractum Glycyrrhizæ, Extractum Sa
parillæ Fluidum Compositum, Infusum Lini Composit
Pilulæ Hydrargyri, and Syrupus Sarsaparillæ Compositu

OFFICINAL PREPARATIONS, U. S.

Extractum Glycyrrhizæ. Licorice.

Extractum Glycyrrhizæ Purum.

Extractum Glycyrrhizæ Fluidum (for flavori

Mistura Glycyrrhizæ Composita. Brown
ture. Dose, ʒj–iv (4. to 16. Gm.).

Trochisci Glycyrrhizæ et Opii (each $\frac{1}{20}$ gra
opium) [and enters into the Pilulæ Ferri Iodidi, Tin
Aloes, and Trochisci Cubebæ].

Glycyrrhizinum Ammoniatum. (To mask
nine.)

Pulvis Glycyrrhizæ Compositus. Compound
rice powder (contains senna, licorice, fennel, washed
phur and sugar.) Dose, ʒj–ij (4. to 8. Gm.).

Powdered licorice root is used as a flavoring ingredient, and as a basis for powders and pills. The Pulvis Glycyrrhizæ Comp., in which sulphur now appears for the first time in combination with senna and fennel, is an excellent aperient.

[Licorice is an excellent demulcent, and in the form of decoction is used in *catarrhal affections* and *diarrhœa*. It is largely used as a flavoring ingredient, and ammoniated glycyrrhizin is perhaps the best adjuvant to quinine, to disguise the bitter taste of that drug. The compound licorice mixture (brown mixture) contains paregoric (f℥ij), antimonial wine (f℥j), and sweet spirits of nitre (f℥ss) in each pint (U. S.). It is very commonly used in *bronchitis*, acute and chronic, in combination with ammonium chloride, and stimulating expectorants like syrup of senega, or tincture ipecacuanha.]

[GOSSYPII RADICIS CORTEX—COTTON ROOT BARK.

The bark of the root of Gossypium herbaceum, Linné, and of other species of Gossypium (N. O. Malvaceæ).

Officinal Preparation, U. S.

Extractum Gossypii Radicis Fluidum. Dose, f℥ss–j (2. to 4. Gm.).

GOSSYPIUM—COTTON.

The hairs of the seed of Gossypium herbaceum, Linné, and of other species of Gossypium, freed from adhering impurities and deprived of fatty matter.

Officinal Preparations.

Pyroxylon. Gun Cotton.
Collodium. Pyroxylon dissolved in ether and alcohol.]

Absorbent cotton is employed in various inflammatory conditions, with the view of excluding air and supplying warmth and slight support. Thus in *burns*, and more especially in those of a superficial nature, the immediate application of a thick layer of cotton-wool relieves the smarting pain and promotes recovery; and the same treatment may be recommended to a blister after the watery fluid has been removed from the bulla. In *acute rheumatism*, also, the

patient may derive much relief from the careful and e
encircling of his inflamed joints with cotton-wool, secu
position by a few turns of flannel bandage.

It is also believed by some aurists to form the best
rial for the construction of an artificial membrana ty

[Cotton-root bark as a parturifacient has considerable
tation throughout the South; it is used in recent dec
or as a fluid extract. It does not appear to have
facient powers (Martin, *Am. Journn. Med. Sciences,*
Essay), although a valuable oxytocic in *tedious labor.*

For Collodium, see page 269.]

GRANATUM—POMEGRANATE.

[*The bark of the root of Punica Granatum, Linné* (*N. O. Grana*

Physiological Action.

Pomegranate bark destroys a *tape-worm*, according to Küchenmeister, in three hours. [As it contains gallotannic acid, it should not be prescribed in combination with metallic salts. It may be given in the form of the fluid extract (not officinal), or it may be used in decoction (℥ij to Oj), as an astringent wash. Pelletiérine is the active principle.]

Therapeutical Action

It is much used as a
thelmintic in veterinary
tice [and is sometimes
in infusion as a gargle
as an injection in *gonor*
A *tape-worm* may b
charged in a few hou
administering the dec
through a stomach tube
following it by castor o
by a dose of the Pellet
tannate, grs. ss. to $\frac{3}{4}$ (.
.05 Gm.), taken fastin
followed by a purgative

[GRINDELIA—GRINDELIA.

The leaves and flowering tops of Grindelia Robusta, Nuttall (*N.*
Compositæ).

Officinal Preparation.

Extractum Grindeliæ Fluidum. Dose, ♏ x
(.65 to 4 Gm.).

This has expectorant and antispasmodic powers, a
cases of asthma, especially with cardiac disorder, it has de
value. It is also given in whooping-cough, hay-fever,

GUAIACI LIGNUM—GUAIAC WOOD.

The heart-wood of Guaiacum officinale, Linné, and of Guaiacum Sanctum, Linné (N. O. Zygophyllaceæ).

GUAIACI RESINA—GUAIAC.

The resin of the wood of Guaiacum officinale.

OFFICINAL PREPARATIONS, U. S.

Tinctura Guaiaci (20 per cent. of the resin). Dose, ♏x–ʒj (.65 to 4 Gm.).

Tinctura Guaiaci Ammoniata (Guaiac 20, Aromatic Spirits of Ammonia 80 parts). Dose, ♏x to ʒj (.65 to 4 Gm.).

Also enters into Syrupus Sarsaparillæ Compositus, and Pilulæ Antimonii Compositæ.

USES.

Guaiac is alterative, and is employed in ***chronic rheumatism, rheumatoid arthritis***, and ***syphilis***. The ammoniated tincture is the best preparation, and is usually given in milk. The tincture is sometimes very efficient in tonsillitis.]

[GUARANA—GUARANA.

A dried paste prepared from the crushed or ground seeds of Paullinia sorbilis, Martius (N. O. Sapindaceæ).

OFFICINAL PREPARATION.

Extractum Guaranæ Fluidum. Dose, ♏x–ʒij (.65 to .8 Gm.).

Contains Caffeine, to which its usefulness in migraine is due, combined with tannic acid, which gives it astringent and tonic properties.]

GUTTA-PERCHA—GUTTA-PERCHA.

[*The concrete exudation of Isonandra gutta, Hooker (N. O. Sapotaceæ).*

OFFICINAL PREPARATION, U. S.

Liquor Gutta-Perchæ (in chloroform 9 per cent.). Used externally and for making charta sinapis.]

Gutta-percha is only adapted for external use, anc service mechanically as a material for splints, being i softened in hot water and moulded to the affected jc limb. It furnishes a cheap and efficient rival to oile and its solution in chloroform forms a good and impe covering in *smallpox*, *erysipelas*, and other affections w is of importance to protect the skin from the action of t

HÆMATOXYLON—HÆMATOXYLON (LC WOOD).

[*The heart-wood of Hæmatoxylon Campechianum, Linné* (*N. O.* *minosæ Papilionaceæ*).

OFFICINAL PREPARATIONS, U. S.

Decoctum Hæmatoxyli. Dose, f℥ij (64. Gm
Extractum Hæmatoxyli. Dose, gr. x (.65 G

Physiological Action.	*Therapeutical Us*
Logwood has astringent properties.	It is an agreeable efficient remedy in *diar* and is well taken by dren. We must rem that it imparts its pink to the feces, and to the should that secretion c to be alkaline.

[It may be combined for diarrhœa as in the follc formula :—]

R.	Extracti hæmatoxyli	gr. x ;	or		65 Gn
	Tincturæ catechu	fʒss ;	"	2	"
	Syrupi	fʒj ;	"	4	"
	Aquæ carui	q. s. ad f℥j ;	"	16	"

S. Ter die sumendus.

[HAMAMELIS—HAMAMELIS (WITCH-HAZE

The leaves of Hamamelis Virginica, Linné (*N. O. Hamamelaceæ*), *co* *in autumn.*

OFFICINAL PREPARATION, U. S.

Extractum Hamamelidis Fluidum. ♏v–ʒj to 4 Gm.).

Is astringent and exerts a special influence over the venous system, producing contraction, in *hemorrhoids*, *varicose veins*, and *ulcers*.

It has also been used locally in the form of a distilled water for sprains and bruises; the diluted fluid extract is more efficient for this purpose than the proprietary medicine usually sold under the name of Witch-hazel Extract.]

[HEDEOMA—HEDEOMA (PENNYROYAL).

The leaves and tops of Hedeoma Pulegioides, Persoon (N. O. Labiatæ).

OFFICINAL PREPARATION, U. S.

Oleum Hedeomæ. Dose, gtt. ij–x (.12 to .65 Gm.).

Hedeoma is a gentle stimulant aromatic used in *flatulent colic*, *sick stomach*, and in *amenorrhœa*. In recent *suppression of the menses* it is a popular domestic remedy, given in warm infusion.]

HUMULUS—HOPS.

[*The strobiles of Humulus lupulus, Linné (N. O. Urticaceæ, Cannabineæ).*

OFFICINAL PREPARATIONS, U. S.

Tinctura Humuli (20 per cent.). Dose, f℥j–iij (4. to 12. Gm.).

Lupulinum. (*The glandular powder separated from the strobiles of Humulus lupulus*). Dose, gr. v–xx (.30 to 1.30 Gm.).

Extractum Lupulinæ Fluidum. Dose, ♏x–xv (.65 to 1. Gm.).

Oleoresina Lupulinæ. Dose, grs. ij to v (.13 to .32 Gm.).

Hops are tonic and probably narcotic, more especially in the form of the old-fashioned hop pillow. Internally they are rarely prescribed. [They may be used as an anodyne cataplasm, either alone or with Indian meal. The preparations of lupulin are sometimes administered in *delirium tremens* as a sedative tonic, and hop tea (℥ss to the pint) flavored with capsicum is also given to alcoholic subjects, with excellent effects. The bitter malt liquors contain hops; they are useful as tonics, and are given to increase the milk during nursing. They are also valuable in som of *insomnia* and in *gastralgia*.]

HYDRARGYRUM—MERCURY (QUICKSILV

[*A shining, silver-white metal, liquid at common temperatures, an the sp. grav.* 13.5, *Hg* : 199.7.

OFFICINAL PREPARATIONS, U. S.

I. In the Metallic State.

Hydrargyrum.
Emplastrum Ammoniaci cum Hydrargyro.
Emplastrum Hydrargyri (mercury 30 per cent.)
Hydrargyrum cum Cretâ (mercury 38 per
 Dose, gr. v–xxx (.30 to 2. Gm.).
Massa Hydrargyri (mercury $33\frac{1}{3}$ per cent.). Bl
Unguentum Hydrargyri (mercury 50 per cent.).

II. Oxidized.

Hydrargyri Oxidum Rubrum.
 Unguentum Hydrarg. Oxidi Rubri (10 per ce
Hydrargyri Oxidum Flavum.
 Unguentum Hydrarg. Oxidi Flavi (10 per cen
Oleatum Hydrargyri (10 per cent.), used extern

III. Sulphuretted.

Hydrargyri Sulphidum Rubrum. (For fumiga

IV. As Protochloride (subchloride ?).

Hydrargyri Chloridum Mite. Dose, gr. ss–x (
 .65 Gm.).
Pilulæ Antimonii Compositæ (calomel $16\frac{2}{3}$ per c
Pilulæ Catharticæ Compositæ (each pill contains
 mel, abstract of jalap, āā gr. j ; ext. colocynth
 gr. j$\frac{1}{3}$; and gamboge, gr. $\frac{1}{4}$). Dose, 1 to 4.

V. As Bichloride (protochloride ?, perchlo Br.).

Hydrargyri Chloridum Corrosivum, gr. $\frac{1}{16}$–$\frac{1}{10}$
 to .006 Gm.).
Hydrargyrum Ammoniatum. Used externally.
Unguentum Hydrargyri Ammoniati (10 per cen

VI. With Iodine.

Hydrargyri Iodidum Rubrum (biniodide), gr. $\frac{1}{16}$ (.004 Gm.).

Liquor Arsenii et Hydrargyri Iodidi (Donovan's Solution). Dose ℳ v–x (.30 to .65 Gm.).

Hydrargyri Iodidum Viride (protiodide). Dose, gr. $\frac{1}{4}$ (.015 Gm.).

VII. With Cyanogen.

Hydrargyri Cyanidum. Dose, gr. $\frac{1}{16}$–$\frac{1}{12}$ (.005 Gm.).

VIII. With Acids.

Liquor Hydrargyri Nitratis (about 50 per cent. mercuric nitrate). As a caustic.

Unguentum Hydrargyri Nitratis (Citrine ointment). (Mercury 7, nitric acid 17, lard oil 76.)

Hydrargyri Subsulphas Flavus. Dose, gr. $\frac{1}{4}$–$\frac{1}{2}$ (Turpeth Mineral). As an emetic, gr. ij–v (.013 to .32 Gm.).

Poisoning.

In the metallic state, mercury exercises but slight influence, but in a state of vapor it is capable of causing violent symptoms. All the salts of mercury are poisonous; but the most important is corrosive sublimate.

The symptoms caused by corrosive sublimate resemble those produced by arsenic, but, from the salt being more soluble, they are more immediate and violent; there is a more marked taste, the evacuations are more frequently bloody, and there is a whitened condition of the epithelium of the mouth. There are three varieties of poisoning with mercury. In the first, the leading symptoms are, violent irritation of the alimentary tube; namely, vomiting, purging, pain at the pit of the stomach, and irritation in the throat; metallic, styptic taste, corrosion of the mouth, tongue, and palate; constriction of the throat, and difficulty of swallowing. Blood evacuated both by vomiting and by stools, suppression of urine, countenance flushed, tumid, and bloated. In the second variety, salivation and sloughing of the mouth succeed to the irritation and inflammation. In the third, mercurial erethism comes on, and is not preceded by the symptoms of local irritation. The first variety arises from the more soluble salts of mercury, in large doses; the second, from the same preparations, but in smaller doses and more diluted; the third, by the more insoluble and refractory compounds.

Morbid Appearances.—These are similar to those attendant on irritative or corrosive poisoning. There are, frequently, shrivelling of the tongue, and enlargement of its papillæ and root. In some cases, red and black spots in the interior of the heart. Corrosion, ulceration, and disorganization of the mucous coat of the stomach and intestines. An inflamed condition of the urinary organs is also frequently observed.

TESTS.

Corrosive sublimate in a solid state is sublimed when heated in a test-tube; and the acrimonious fumes speedily condense into a crystalline, semi-transparent mass. Placed in a test-tube, and lime-water, potassa, or soda added in solution, a yellow (*peroxide of mercury*) precipitate is thrown down.

In solution, ammonia throws down a white (*ammonio-chloride of mercury*) precipitate. Solution of proto-chloride of tin affords a precipitate (calomel), which, at first, is white, but acquires a leaden color on adding more of the test; when this precipitate (after being well agitated) is dried, minute globules of quicksilver may be detected. Transmission of sulphuretted hydrogen produces a (*sulphuret of mercury*) precipitate, which at first is leaden-colored, then black. Solution of iodide of potassium affords an intensely brilliant scarlet (*biniodide of mercury*) precipitate, which dissolves in an excess of the test. Corrosive sublimate may be reduced to the metallic state through galvanic influence, applied as follows: A drop of the suspected fluid being laid on a piece of polished gold, and both it and the gold touched at the same instant by a point of iron (as a thick needle, or the end of a penknife), a small silvery coating of mercury soon becomes apparent on the gold. Being freely soluble in sulphuric ether, addition of this fluid is of much service when the poison is found mingled with organic or other matters.

The cyanide, when heated in a tube, evolves cyanogen gas, which will burn with a rose-red flame, with a blue halo.

Calomel is sublimed by heat. When treated with potassa, or lime-water, it assumes a black appearance, mercurous oxide being separated.

On cautious application of heat, the biniodide sublimes in red-colored crystals, which soon change to yellow, and subsequently to a dusky hue. On exposure to a sufficient degree of heat, iodine fumes are disengaged. When mixed with potassa (equal weights) and heated in a test-tube, decomposition occurs; metallic mercury being sublimed, and iodide of potassium deposited in the tube.

When red precipitate is exposed to heat in a test-tube, metallic mercury is sublimed, with the evolution of oxygen.

If the persulphate be treated in the same manner as the foregoing, sublimation of the mercury takes place, and sulphurous acid gas is evolved.[1]

ANTIDOTES.

Acute poisoning produced by corrosive sublimate requires *albumen* (white of eggs, blood, or flour and water) and demulcents. Milk may be freely drunk, and vomiting encouraged. Gold-leaf and iron-filings form a chemical antidote, decomposing the chloride and depositing the mercury. It has been stated that the hydrated proto-sulphuret of iron, if taken immediately, completely destroys the poisonous properties of the corrosive sublimate.]

LOCAL ACTIONS.

Physiological.

One preparation, the acid nitrate, is a very powerful caustic, in virtue of its free nitric acid. Salivation has occasionally followed its use.

[When using the acid nitrate of mercury as a caustic to chancroids or other sores, care should be taken to have it diluted with from ten to twelve parts of water. When applied stronger it sometimes causes very troublesome hemorrhage.]

Other preparations are occasionally used externally for

Therapeutical.

The acid nitrate is used as an application in lupoid ulcerations, and in ulcerations about the *os* and *cervix uteri*.

Calomel in lime-water [℥j to Oj] forms the familiar black-wash which is of great service in *venereal ulcerations*, either primary or secondary; and the same salt, in the form of powder, may be dusted on *condylomata* or *corneal ulcerations* with advantage. Corrosive sublimate, in the form of lotion, often checks troublesome *ul-*

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[1] From Griffith's Formulary.

skin diseases, syphilitic ulcerations, etc., and in virtue of the destructive power which they all (but more especially corrosive sublimate) exert over the lowest forms of animal and vegetable life. In virtue of this power corrosive sublimate is now used to carry out the antiseptic process of Lister, and in Germany it has almost entirely superseded carbolic acid for this purpose, the great advantages which it possesses over other agents being its non-volatility. Mercury, being readily absorbed by the skin, is frequently introduced into the system by this channel.

cerations of the throat;
both this and the vari
forms of mercurial ointm
are almost infallible re
dies for *pediculi* or for *fa*
tinea tonsurans, and ot
skin diseases which are kno
to depend on the presenc
minute vegetable grow
We must remember, h
ever, that dangerous sy
toms, and even death, h
occasionally been caused
the absorption of the min
when thus applied.

Many chronic skin
eases may be well treate
citrine ointment. *Goitre*
quently yields in Indi
the inunction of the bi
dide, and Mr. Marshall
highly recommended
oleate of mercury as an
plication to various join
fections.

[The biniodide has
used as a substitute for
rosive sublimate in the t
ment of putrid lochia
septic poisoning after
(1 to 4000 parts of wa
used in a douche, repeate
cording to the urgency
case. It has also been
in ophthalmic surgery
antiseptic with good res

The external applic
of mercury, by the ca
vapor bath, or blue oint
having for its object th
duction of constitu
effects, will be consi
further on.

INTERNAL ACTIONS AND USES.

1. *Brain and Nervous System.*—Mercury, pushed up to the development of poisonous symptoms, produces a curious condition of nervous debility and tremors, which is occasionally met with in workmen who have been freely exposed to its fumes in silvering glass.

1. Mercury has been found of most signal service in some forms of advanced ***syphilitic disease affecting the brain.***

2. *Circulation and Respiration.*—One form of mercury, the perchloride, or corrosive sublimate, acts as a cardiac poison, distinctly lowering the action of the heart, but the other preparations have no such influence. Mercury causes anæmia by destroying the red corpuscles of the blood. It has long been observed that they become spheroidal and of deeper hue, have less cohesion, and finally dissolve. The blood becomes more fluid, and the fibrine less coagulable. [But in minute doses, gr. $\frac{1}{120}$ to $\frac{1}{100}$, given thrice daily for a length of time, corrosive sublimate acts as a tonic and increases the number of the red-blood corpuscles, particularly in *syphilitic anæmia.*]

2. An exception to this general rule must be noted in secondary syphilis, with anæmia, where mercury undoubtedly increases the proportion of the red to the white corpuscles. Mercury has been strongly recommended as removing congestive œdema, and promoting the absorption of exudations in some forms of bronchitis.

3. *Secreting Organs—Stomach and Intestines.*—Mercurial preparations, and more especially calomel, act as purgatives, causing repeated grayish or greenish evacuations; the duodenum being

3. Experience demonstrates that the form of ***vomiting*** common in children, where the stomach rejects everything suddenly and violently, $\frac{1}{3}$ gr. of hyd. cum cretâ or $\frac{1}{6}$ gr. of calomel every hour, will often

the portion of the gut primarily acted upon. The action of mercury on the liver has provoked a good deal of controversy.

Calomel and blue pill are frequently used as adjuncts to other purgative drugs.

Kidneys.—Mercury, and more especially blue pill, has the power of promoting the action of diuretics.

Saliva.—Mercury is well

cure, as Ringer has shown. Minute doses of the perchloride are also useful in dysenteric diarrhœa.

Clinical evidence has most distinctly proved, not only that the well-known symptoms of *biliousness* may be most effectively removed by the old-fashioned blue pill and black draught, but that an increase of bile may also be thus produced in the motions. This has been explained by the irritating influence of the mercury on the duodenum, and the consequent sweeping away of the secreted bile which, under ordinary circumstances, is well known to undergo re-absorption from the intestines.

Mercury has been supposed also to act by stimulating the gall-bladder to contract. But the careful experiments of Rutherford have proved that whilst calomel stimulates the intestinal glands, but not the liver, corrosive sublimate is a powerful hepatic, but a feeble intestinal stimulant.

There is no foundation for the belief that calomel acts by being converted, through the action of the gastric juice, into corrosive sublimate.

Thus, in the form of Guy's pill, containing blue pill, squill, and digitalis, we obtain a most marked diuretic effect.

The old-fashioned notion is

known to stimulate the action of the salivary glands, large quantities of their secretion being poured out when the drug is pushed far enough. The fluid, at first thick and containing much albumen, subsequently becomes thin and watery.

Skin.—Inunction of ung. hydrargyri is apt to bring out a crop of irritable pimples, and one of the symptoms of mercurial poisoning is an eczematous eruption.

Mercury is supposed to stimulate absorption by rendering effused fibrine less cohesive, by promoting its disintegration, and by retarding cell-growth.

now happily exploded, that we must measure efficacy of our mercurial treatment by the amount of salivation, our object being always to stop short at any evidence of increased salivary secretion.

Mercurial ointments are useful as stimulants in many chronic skin affections as well as in pruritus and pityriasis of the scalp.

Mercury was accordingly invariably given, in former days, in all cases where any effusion of fibrine was supposed to have taken place, such as the second stage of ***pneumonia.***

Specific Action.

Mercury may be said to act as a specific, or at least as a true vital antidote, in ***syphilis,*** and more especially in the primary and secondary stages of that insidious malady. When we are satisfied that we have to deal with an infecting sore, the sooner we begin our mercurial treatment the better; and it is well to push it in small doses for a considerable time, until the gums are slightly affected. For this purpose moderate doses of blue pill and opium are perhaps the most effectual; but we may also derive much benefit now and then from rubbing in ʒss to ʒj of blue ointment, night and morning. The whole train, also, of secondary eruptions of the skin, ***sore throat, condylomata, iritis,*** etc., must also be subjected to mercurial treatment, and the calomel vapor bath and the bichloride of mercury will here do us good service.

It is doubtful whether, by the most careful and scientific treatment of a primary sore, we can altogether prevent the development of secondary symptoms; but if we cannot do

this we can at least postpone them, and render them
severe, and also lessen the probability of tertiary misc
In order to get the most satisfactory results, we must
tinue a careful administration of mercury for many mo
and if this be done, there seems no doubt that syphilis
be readily cured, or finally be eradicated from the syste

In the *congenital syphilis* of young children, the loca
plication of a little blue ointment, either rubbed int
skin or smeared over a bit of flannel wound round the
is eminently satisfactory in its results.

Mercury was formerly believed to have a specific infl
in checking the inflammations of serous membranes, an
consequently invariably used in *peritonitis*, *pericarditis*
pleurisy; but faith in this conviction has been a good
shaken of late, and the conventional calomel and opium
not so often appear in prescriptions as formerly.

On the continent much importance is attached to c
erable doses of calomel in the early stages of *typhoid*
but statistics do not seem to prove any decided advant
accruing from this mode of treatment.

DRAWBACKS, CAUTIONS, ETC.

It is important to be familiar with the signs which
cate when the mercurial treatment has been carrie
enough. The gums generally give the first token in
cate red line running along their margin, followed by
thickening of the interdental portions, and finally retr
from the teeth. To this succeeds a metallic taste
mouth, an increased flow of saliva and a peculiar fe
breath, and we generally find that the very slightest "
ing" of the gums is sufficient to show that the physiol
effect of the mineral has been attained.

[It should be remembered that salivation comes on
slowly and sometimes appears a day or two after the
istration of the mercurial has been suspended; showin
the system may be fully influenced by the remedy
least twenty-four hours before its specific action on the
is apparent.]

Whilst a patient is undergoing a mercurial cour
must keep up his constitution well with good diet, iro
perhaps a little stimulant; for experience shows tha
cury far more speedily exerts its debilitating influe
weak persons or those who are enfeebled by fasting.

We must, therefore, beware of its use in consumptive or strumous persons, or in those suffering from Bright's disease or diabetes, and recollect that idiosyncrasy may here play an important part, and that some persons are much more readily salivated than others, without known cause.

Children, more especially those under the age of two years, are rarely if ever salivated, and only show the influence of the drug by peculiar greenish stools; but in the fortunately exceptional cases of its occurrence it is too often uncontrollable, and is followed by destructive ulceration and even gangrene. Another danger pointed out by Mr. Hutchinson is of causing a peculiar malformation of the teeth due to the incautious use of gray and other so-called "teething" powders in early life.

Mode of Elimination, etc.

Mercury is eliminated principally by the urine, but also in smaller degree by the saliva and the biliary and intestinal secretions.

Modes of Administration, Dose, etc.

In the treatment of syphilis, mercury may be given by inunction, in which from ʒss to ʒj of blue ointment is rubbed into the skin once or twice a day, varying the place of application so as to avoid that cutaneous irritation which may otherwise result. This method, although very effectual, is dirty, and rather liable to cause excessive salivation.

The oleate of mercury made by dissolving the oxide in oleic acid, and varying according to strength from a clear solution to a resin-like ointment, is a very clean way of using the drug externally, and, in addition to its value in syphilis, may be employed in articular inflammation, simple synovitis, threatening abscess, orchitis, sycosis, etc. (Marshall.)

Fumigation is also extensively employed, but it is only of real service in the cutaneous affections dependent on secondary syphilis, where the actual deposition of the vaporized calomel on the skin produces a beneficial local influence. Twenty grains of calomel are used at each sitting, and are diffused along with watery vapor by a spirit-lamp, and brought in contact with the patient, as he sits covered with a blanket, on a perforated chair, over the fumigating apparatus.

Corrosive sublimate has been used by subcutaneous in
tion, but in this way it creates great local irritation; h
black, painful lumps, often running into abscess, being
duced at the site of puncture, and although much ingen
has been expended on the search for a harmless solution
success has yet attended these efforts. This, howe
matters the less, because no reliable evidence has been off
to show any advantage in this plan over others, and it is
doubtedly much better to administer it by the mouth, w
it is specially useful in chronic skin and throat affecti
Some authorities prefer to give it alone, whereas others ad
a combination with potassium iodide, thus:—

℞. Hydrarg. chlor. corrosiv.	gr. ss;	or		03 G
Potassii iodidi	ʒss;	"	2	"
Decocti cinchonæ	f℥viij;	"	256	"

S. f℥j ter die post cibum.

℞. Hydrarg. chlor. corrosiv.	gr. ij;	or		12 G
Acidi muriatici diluti	f℥ij;	"	8	"
Mellis despumati	f℥j;	"	32	"
Aqua destillatæ q. s. ad	f℥x;	"	320	"

An excellent gargle for *syphilitic throat ulceration.*

Opinions vary considerably regarding the best for
mercury for internal administration in the treatment o
philis. Mr. Hutchinson prefers hydrarg. cum cretâ in
of from gr. iij to gr. v, two or three times a day. Ricor
the other hand, advises gr. j–iij of the green iodide [bu
ordinarily given in much smaller doses to begin with], w
others are content to employ the pil. hydrarg. in gr.
doses in pill, keeping its purgative properties in check
little opium.

℞. Pil. hydrargyri	gr. ij;	or	12 G
Pulveris opii	gr. ¼;	"	015
Confectionis rosæ	q. s.		

Ut fiat pilula quartâ quaquâ horâ sumenda.

[The following is a good formula for the protiodide :-

℞. Hydrarg. iodidi viridis,				
Extract. lactucarii,	āā gr. xlv;	or	3	G
Extract. opii	gr. xv;	"	1	"
Confectionis rosæ	ʒjss;	"	6	"

In pil. no. lx dividenda.
S. Dose, 1 to 3 pills a day.]

In *secondary syphilis.*]

For purgative purposes the blue pill is generally prescribed in 5-grain doses, taken overnight, and aided by some saline aperient in the morning.

℞. Hydrarg. chlor. mitis	gr. xij;	or	80 Gm.	
Mannæ	gr. vj;	"	40 "	
Pulveris tragacanthæ comp. [Br.]	gr. vj;	"	40 "	M.

Divide in pilulas sex. Capiat duas pro re nata.

A good purgative formula.

As a diuretic the following is the useful old combination, sometimes known as the "Guy's," and sometimes as "Baillie's Pill:"—

℞. Pilulæ hydrargyri	gr. iij;	or	20 Gm.	
Pulveris scillæ	gr. jss;	"	10 "	
Pulveris digitalis	gr. ss;	"	03 "	M.

Fiat pilula bis terve die sumenda.

[Unguentum hydrargyri nitratis (citrine ointment) is much used as a stimulant and alterative application in chronic skin diseases and ophthalmia. It generally requires to be well diluted.

The decoction of Zittmann may be used with great advantage as a gentle diaphoretic and alterative in secondary syphilis, either alone or as an adjuvant to mercurials. It has been also used with advantage in scrofulous conditions of the system, in chronic rheumatism, in skin diseases, and obstinate ulcerative affections. The dose is one wine-glassful of each strength several times daily. The formula of the Prussian Pharmacopœia is as follows:—

Decoctum Zittmanni fortius.—Take of sarsaparilla root cut 100 parts; digest in water 2600 parts for 24 hours, and add, inclosed in a linen bag, powdered sugar and alum, each 6 parts, calomel 4 parts, and cinnabar 1 part; then heat in a covered vessel placed in a steam-bath for three hours, stirring frequently, and, near the end of the boiling, add anise and fennel, bruised, each 4 parts, senna, cut, 12 parts, and licorice-root, cut, 12 parts. Express, strain, set aside for some time, and decant to obtain 2500 parts of the clear liquid; 2500 grammes of this are to be divided into 8 parts.

Decoctum Zittmanni mitius.—Take the residue left from the preceding and 50 parts of sarsaparilla; heat with water 2600 parts, for three hours, in a covered vessel placed on a steam-bath, stirring frequently, and when near the end of the boiling, add lemon-peel, cinnamon, cassia, cardamom,

and licorice-root, each, cut and bruised, 3 parts. Ex
and operate as before, to obtain 2500 parts.[1]

Mercury was detected by Wiggers in this decoctio
very small proportion. It should not be prepared in m
lic vessels lest the mercurial in solution should be de
posed.]

[HYDRASTIS—HYDRASTIS.

The rhizome and rootlets of Hydrastis Canadensis, Linné (N. O.
culaceæ).

Officinal Preparation, U. S.

Extractum Hydrastis Fluidum. Dose, ♏ v-
(32. to 2 Gm.).

Tinctura Hydrastis (20 per cent.). Dose, ʒss-
to 8 Gm.).

Hydrastis is an indigenous bitter tonic, containing th
kaloids berberine and hydrastine, and is said to have de
diuretic properties. A decoction has been used as an i
tion in *gonorrhœa.* Its exact therapeutic place among
dies does not appear to be well defined; but it is claim
be a stomachic tonic, useful in atonic dyspepsia, in ch
alcoholism, and in hemorrhoids and some hepatic disor

HYOSCYAMUS—HENBANE.

[The leaves of Hyoscyamus niger, Linné (N. O. Solanaceæ), coll
from plants of the second year's growth.

Officinal Preparations, U. S.

Abstractum Hyoscyami. Dose, gr. i–iij (.
.20 Gm.).

Extractum Hyoscyami Alcoholicum. Dos
$\frac{1}{6}$ to gr. j (.01 to .06 Gm.).

Extractum Hyoscyami Fluidum. Dose,
(.30 Gm.).

Tinctura Hyoscyami (15 per cent.). Dose, f
(2. to 8. Gm.).

[1 The National Dispensatory, Stillé and Maisch, Philade
1879, p. 497.]

Hyoscyaminæ Sulphas. Dose, $\frac{1}{60}$–$\frac{1}{4}$ (.001 to .015 Gm.).

Hyoscyamus is, like belladonna, a hypnotic and mydriatic, and owns the same antidotes.]

The remarks made with reference to stramonium are equally applicable to hyoscyamus, which also contains an alkaloid, hyoscyamine, probably identical with atropine. The main point of difference, then, from belladonna, is the superior narcotic powers of hyoscyamus, which have been especially prized and developed in lunacy practice. It is also a favorite remedy in painful and irritable *affections of the bladder*, where it seems to exert a marked soothing influence, and it is an excellent addition to cough mixtures.[4]

℞. Extracti belladonnæ	gr. iij;	or		20	Gm.
Camphoræ	gr. xij:	"		80	"
Extracti hyoscyami	gr. xv;	"	1		"

Misce, fiant pilulæ sex, quarum sumat unam hora decubitûs.

Narcotic for *nervous insomnia.*

℞. Tincturæ hyoscyami	♏xxx;	or	2		Gm.
Potassii carbonatis	gr. x;	"		65	"
Syrupi papaveris [Br.]	fʒij;	"	8		"
Aquæ camphoræ q. s. ad	f℥iss;	"	48		"

Misce, fiat haustus horâ somni sumendus.

Narcotic.

℞. Vini ipecacuanhæ	fʒij;	or	8	Gm.
Ext. hyoscyami fluid.	fʒj;	"	4	"
Tincturæ scillæ	f℥ss;	"	16	"
Syrupi tolutani	f℥j;	"	32	"
Aquæ carui q. s. ad	f℥vj;	"	192	"

Misce. Capiat semuncium ter quaterve in die.

Cough mixture.

Dr. Robert Lawson, late of the West Riding Asylum, has made a large variety of very interesting physiological and therapeutical observations on the actions and uses of hyoscyamine, the alkaloid of hyoscyamus. He has found that it produces "a subdued form of mania, accompanied by almost complete paralysis of the voluntary muscles, and ending in quiet and refreshing sleep;" and he thinks that this might advantageously be substituted for opium in many forms of extreme excitement occurring among the insane. He has derived great benefit from the drug in "the treatment of recurrent, acute and subacute *mania*, and the m omania of suspicion," and recommends the following f mula:—

℞. Hyoscyaminæ	gr. j;	or		06	Gm.
Sp. ætheris [Br.][1]	♏viij;	"		50	"
Alcoholis	♏xxiv;	"	1	60	"
Aquæ fontis	q. s. ad f℥j;	"	32		"

Misce, ut fiat haustus.

Ringer records a very interesting case of acute mania which gr. j of hyoscyamine quieted the patient and produ sleep, the first dose causing deep flushing of the face hands, with quickening of the pulse. He has found it less in *delirium tremens*. Mr. Clifford Gill, of the Y Asylum, has made many observations on the drug, find that physiologically it causes loquacious rambling, halluci tion of sight and hearing, drowsiness, hypermetropia, ness of mouth, and deficient co-ordination of lower lin In violent mania it acts well, but as some persons are int rant of its action, and death has been caused by syncope must proceed cautiously and begin with small doses (gr. $\frac{3}{8}$). The pure alkaloid is quite expensive, but an efficac extract containing the amorphous salt is made by Me and Gill recommends a solution of gr. ij to the ℥j of e and alcohol, freshly prepared; as it soon deteriorates, it be kept from the light. It has also been used with s success in chorea.

[According to Gnauck (Centralblatt für die Med. senschaften, No. 45, 1881) hyoscyamine is compose hyoscine and tropaic acid. From experiments upon hea individuals and others, he concluded that hyoscine is times stronger than hyoscyamine. Small doses of the io of hyoscine produce the same symptoms as hyoscyamin addition, however, there is a retardation of the pulse with larger doses, varying with the dose and susceptibili the individual.

Even $\frac{1}{600}$ of a grain invariably produces some of its e in from two to twelve minutes. The fall in the pulse i first symptom to appear, and the last to disappear, th duction ranging from eight to twenty beats.

A slight reduction of the pulse also occurs at the begi of the action of atropine and hyoscyamine, and with doses, but this is quickly followed by paralysis of the terminal filaments of the vagus. Hyoscine probably causes the fall by irritation of their filaments; tropaic acid, therefore, having the power to alter its action.]

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[1] [A solution of ether, one part, to rectified spirit, two par

[ICHTHYOCOLLA—ISINGLASS.

The swimming bladder of Acipenser Huso, Linné, and of other species of Acipenser (Class Pisces, Order Sturiones).

Emplastrum Icthyocollæ.

Isinglass is only used in medicine as an article of diet for the sick, and as the basis of *court-plaster.*]

[IGNATIA—IGNATIA.

The seed of Strychnos Ignatii, Bergius (N. O. Loganiaceæ).

OFFICINAL PREPARATIONS, U. S.

Abstractum Ignatiæ. Dose, gr, $\frac{1}{4}$-$\frac{1}{2}$ (.015 to .03 Gm.).

Tinctura Ignatiæ (10 per cent.). ♏ ij-x (.13 to .65 Gm.).

Is used for the same purpose as Nux Vomica, but is a somewhat stronger preparation; the seeds containing about one per cent. each of strychnine and of brucine. (See NUX VOMICA.)]

[Infusa.

The officinal INFUSIONS are—

Infusum Brayeræ (6 per cent.).
" Cinchonæ (6 per cent.).
" Digitalis ($1\frac{1}{2}$ per cent.).
" Pruni Virginianæ (4 per cent.).
Infusum Sennæ Compositum (sennæ 6, manna 12, sulphate of magnesium 12, fennel 2, boiling water q. s. ad 100 pts.).

NOTE.—An ordinary infusion, the strength of which is not directed by the physician, nor specified by the Pharmacopœia, shall be prepared by the following formula: The substance, coarsely comminuted, 10 parts; boiling water 100 parts; water, to make 100 parts by weight. Put the substance in a suitable vessel, provided with a cover, pour upon it the boiling water, cover the vessel tightly, and let it stand two hours, then strain and pass enough water through the strainer to make the infusion weigh one hundred parts.]

[ILLICIUM—ILLICIUM (STAR ANISE).

The fruit of Illicium anisatum (N. O. Magnoliaceæ).

Contains a volatile oil corresponding with the tests f of anise, for which it is substituted (see Anisum)].

INULA—INULA.

[The root of Inula Helenium, Linné (N. O. Compositæ).

Elecampane contains a large proportion of a pe starch (Inulin), also a resin, and a bitter crystallizable stance, Helenium, with alant camphor. The powdered gr. xx–ʒj (1.30 to 4. Gm.), is used in a decoction (Oj) as a diaphoretic and expectorant.]

IODUM—IODINE.

[A bluish-gray non-metallic element obtained principally from the a sea-weeds. It melts and raises in purple vapor when heated.

In bluish-black crystalline scales having the metallic lustre. Its gravity is 4.9. I. = 126.6.

Officinal Preparations, U. S.

Tinctura Iodi (Iodine 8 per cent.). Dose, ♏ v– to .65 Gm.). Generally used externally.

Liquor Iodi Compositus (iodine 5; potass. io distilled water 85 pts.). Lugol's Solution. Dose, g (.30 to .65 Gm.).

Unguentum Iodi (Iodine 4 per cent.; potass. per cent. in benzoinated lard).

Liquor Arsenii et Hydrargyri Iodidi (Don Solution). Dose, gtt. v–x (.30 to .65 Gm.).

Syrupus Ferri Iodidi (iodide of iron, 10 per Dose, ♏ x–xxx (.65 to 2. Gm.).

Pilulæ Ferri Iodidi (each containing gr. j of iodide).

Amylum Iodatum (starch 95, iodine 5 parts). gr. v–ʒj (.32 to 4. Gm.).

Syrupus Acidi Hydriodici (contains 1 per absolute acid). Dose, ʒss–iv (2 to 16 Gm.).

Also enters into Sulphuris Iodidum, Argenti Iodidum, Arsenii Iodidum, Liquor Arsenii et Hydrargyri Iodidi, Hydrargyri Iodidum Rubrum, Hydrargyri Iodidum Viride, Plumbi Iodidum, Potassii Iodidum, and Unguentum Potassii Iodidi, Ferri Iodidum Saccharatum, Sodii Iodidum, Ammonii Iodidum, Zinci Iodidum.

ANTIDOTES.

Starch and demulcents. For the inconvenience arising in some persons very susceptible to iodine (as the severe catarrhal symptoms after taking potassium iodide) a warm bath and small doses of deodorized tincture of opium are useful.

INCOMPATIBLES.

With Iodine.—Alkalies and alkaloids (quinine and strychnine); extracts containing starch; water precipitates the iodine from tinctura iodi. The compound liquor may be diluted with water without precipitation.

With Potassii Iodidum.—Acids, acetate of lead, and the metallic salts generally.

With Ferri Iodidum.—Lime-water, alkalies, and the vegetable astringents.]

LOCAL ACTIONS.

Physiological.

Iodine in substance is never used save for its antiseptic properties. Dissolved in spirit, however, it is an excellent counter-irritant, producing itching and smarting of the skin, with desquamation of cuticle, and even blistering if the application be too frequently repeated. It has been shown that this local action of iodine is attended by a very free extrusion of colorless blood-corpuscles into the subcutaneous cellular tissue.

Therapeutical.

It is therefore of some value for the correction of fetor in drains, etc.

The tincture or liniment of iodine is very extensively used as a counter-irritant application to *enlarged glands*, *chronic abscesses*, *swollen joints*, *chilblains*, and to various forms of skin disease, more especially the common varieties of ringworm, which speedily yield to this treatment. It is very useful when painted over the chest in chronic pneumonia

Experiment has proved that iodine is not absorbed into the system through the unbroken cuticle of adults. M. Jules Simon, however, tells us that the application to the skin of children of equal parts of tinct. of iodine and glycerin will cause on the following day the appearance of iodine and albumen in the urine.

Inconvenient results have occasionally followed its absorption after injection into ovarian cysts.

and fibroid and tubercular affections of the lungs; and Mr. Jordan, of Birmingham, has drawn attention to the great success attained by him in the dispersion of boils, carbuncles, and suppurating glands by iodine freely applied to a neighboring vascular area.

It is also an excellent injection into various secreting cavities, curing hydrocele by obliterating the sac of the tunica vaginalis, acting well on the same principle in some rare cases of ovarian dropsy and bronchocele, and deodorizing and lessening discharges in empyema and suppurating glands. Pledgets of iodized wool for the vagina will be found useful.

CONSTITUTIONAL ACTION.

Physiological.	*Therapeutical.*
1. *On Brain and Nervous System.*—No special action on the nervous system has been observed, unless we hold that the uncomfortable sensations of misery and depression occasionally following the use of pot. iod. may be thus explained, and patients occasionally complain of weariness and muscular debility, due, no doubt, to the action of the potassium on the spinal cord.	1. Iodide of potassium is of great service in many brain diseases, and most especially those in connection with tertiary syphilis, where gummata and other forms of tumor cause those excruciating pains and varying nervous phenomena which have been so ably described by Drs. Broadbent and Buzzard.
2. The effects of iodine on the *circulation* have never	2. Pot. iod. has been used with great benefit by Dr.

been properly estimated, but some observers say that it tends to contract the vessels and cause increased rapidity of the heart's action. Pot. iod. has very swift diffusive power, entering the blood very rapidly, and being given off within ten minutes after ingestion.

3. On *respiration* and *temperature* no effects have been noted.

4. Effects on *secretion*.

i. *Intestinal.*—Nothing special save occasional loss of appetite and disordered digestion.

ii. *Urinary.*—Pot. iod. has some diuretic action, more especially in connection with other drugs.

iii. The salivary secretion is often markedly increased, true salivation being sometimes produced.

iv. It is also believed that pot. iod. has some special action on glandular tissues in general, increasing their absorptive powers, and even exciting them to absorb themselves; and in support of this last proposition it has been stated that, under its use, the mammæ and testicles have been observed to waste and disappear. This conclusion has evidently been arrived at, however, by confusing the *post*

Balfour and others in aortic aneurism, several successful cases having been reported. It is difficult to explain the *rationale* of its action, but it is essential that large doses (twenty grains) be prescribed and continued regularly for a year or more.

ii. Pot. iod. is occasionally used to heighten the diuretic action of other drugs.

iv. Pot. iod. is often given to facilitate and hasten the absorption of the products of inflammation in the later stages of pleurisy, pneumonia, pericarditis, etc.

It is probable that in presence of the ozone and acids of the blood free iodine is set free, which then acts on those albuminoid substances for which it has an affinity.

with the *propter hoc*, and it is probable that the remedy does not so much actually stimulate the absorbents as reduce effused lymph to a condition more favorable for elimination.

5. It also has the power of removing various metallic substances from the tissues, mercury and lead, for instance, being occasionally deposited in the form of an insoluble albuminate, and released from this condition by the action of the drug.

6. Finally pot. iod. has an irritating action on mucous membranes, causing redness, tingling, and free secretion, much resembling an ordinary catarrh, and also thinning and liquefying tenacious pathological mucoid secretions.

7. There are other important uses of pot. iod. which cannot be arranged under the preceding categories, and which must therefore, if we admit the use of such a word, be called specific. These are its influence over syphilis, gout, chronic rheumatism, and simple periostitis.

In the somewhat mysterious language of old-fashioned therapeutics, potassic

5. In chronic lead-poisoning, so often met in house-painters, and to remove mercury from the system, we generally prescribe pot. iod., and in the latter case we must not be surprised if our patient is suddenly seized with profuse salivation. This is explained by the released mercury finding its way back into the circulation, and exerting its usual influence on the salivary glands.

6. Pot. iod. is often prescribed in cases of bronchitis where the expectoration is thick, tenacious, and difficult of expulsion, and it here acts well by thinning the sputa.

7. In cases of tertiary syphilis pot. iod. often acts like a charm. In the primary and secondary forms it is of little or no use, but when the deeper tissues begin to be affected, and when we meet with deep rupial or other ulcerations of the skin, ulcers in the throat, periostitis, and head symptoms, we may then prescribe iodine with the certain expectation of relief.

iodide has also been known as an "alterative."

In chronic gout it is also of service, and in chronic rheumatism, more especially in those cases where we meet with tenderness to pressure and nocturnal increase of pain. In simple periostitis of the head, sternum, or tibia, which often results from exposure to cold, pot. iod. has an almost magical effect, and will often bring about a cure after two or three days' treatment.

Pot. iod. is eliminated from the body by the urine, saliva, tears, milk, etc.; it is rapidly absorbed, experiment having shown that water containing a minute quantity of the salt has its diffusive power greatly increased. It can be detected in the urine in ten minutes after being swallowed, and is rapidly given out, so that the whole may be recovered from the various secretions.

Disadvantages and Contra-indications.

As regards its disadvantages and contra-indications we must remember the possible occurrence of iodism, to which unpleasant symptoms some persons are much more susceptible than others. These consist, in the first place, of irritation about the mucous membranes, running at the eyes and nose, sneezing, frontal headache, swelling of the eyes, and salivation; an eruption not unlike nettle-rash is sometimes observed; occasionally acne may be the result, and Ringer has described a peculiar petechial eruption affecting the legs. Quite recently Mr. J. Hutchinson has expressed his belief that the formidable pustular eruption known as hydroa is really caused by iodide of potassium; but in my own experience and that of others who have freely prescribed the drug, these various uncomfortable effects are comparatively seldom observed, a curious point being that iodism seems to be much more readily excited by small than by large doses of the drug.

In some persons a good deal of depression and digestive derangement is caused, with nausea, diarrhœa, and debility, and troublesome pains in the joints. It is badly borne exophthalmic goitre, causing rapid emaciation.

A variety of eruptions have been described, all of whi are more likely to occur in patients suffering from kidn disease :—

1. A rash resembling urticaria has been observed.

2. An eruption which probably, according to its vari stages, may be vesicular, papular, or pustular, closely rese bling acne, or a more formidable condition of things m arise from its development into bullæ, which occasiona bursting may form fungoid masses, varying in size fron pea to a shilling. This is held to differ from hydroa, wh Mr. Hutchinson tells us is almost invariably due to iodid potassium.

3. Small round miliary discrete petechial spots on front of the leg, below the knee, occurring from two to days after the moderate use of the drug.

4. A general eruption of purpura. Dr. Stephen Macke records a fatal case in a child of five months, followin single 2½-grain dose.

5. A tendency to erysipelas has been noted in pati taking potassic iodide.

It is fortunate for the credit of one of our most us drugs that these eruptions are rarely observed, the most c mon being a few acneiform pustules on the face, which c ful microscopic observations have proved to be quite un nected with the sweat-glands, but to depend on pluggin the small vessels with coagula, followed by rupture and trusion of their contents.

ANTIDOTE.

Some few years ago Sir James Paget observed that addition of sp. am. aromat. to pot. iod. not only lessened chances of iodism, but enabled us to limit ourselves smaller dose, and this has come very generally into Seguin tells us that we can usually avoid iodism if we pot. iod. in free dilution on an empty stomach, about ha hour before a meal. He points out that, if given on stomach, the acid reaction of the half-digested food spli the salt and liberates free iodine.

Dose and Mode of Administration.

Tinctura iodi 5 to 20 minims, but this is seldom prescribed internally.

Pot. iod. as anti-syphilitic, from 3 to 30 grains, or even 60, according to the judgment of prescribers, it being necessary in obstinate cases to push the drug very freely.

Professor Syme, however, used to say that all good effects can be obtained by two or three grains, and in ordinary cases of syphilis or periostitis, rheumatism, etc., this will be found a sufficient dose, copious dilution aiding its effects.

In *aneurism* we must give at least twenty grains, and in *advanced syphilitic affections* even larger doses are well borne.

℞.	Potassii iodidi	gr. xl ;	or	2	60 Gm.
	Spiritûs ammoniæ aromatici	f℥ss ;	"	16	"
	Syrupi aurantii	f℥j ;	"	32	"
	Decocti sarsæ compositi ad	f℥viij ;	"	256	"

Capiat unciam unam ter in die.

Coster's paste, or iodine dissolved in colorless oil of tar, is a useful application in *ringworm*.

℞. Iodi ʒij.
Ol. picis liq. ad ℥j. M.
(The colorless oil of tar.)

It is sometimes convenient to decolorize iodine, and this may be done by carbolic acid, or by adding forty minims of a saturated solution of hyposulphite of sodium to each ounce of the tincture.

Linimentum potassii iodi cum sapone P. B. is an excellent preparation, very useful in chronic rheumatism and enlargement of the joints.

[Hydriodic acid is a recent addition to our means of administering iodine for obtaining the constitutional effects, and it has been used with success in *asthma*, *bronchitis*, and *hay fever*. It is prepared on a small scale by the action of hydrogen sulphide on iodine mixed with water. It is, when pure, a colorless, irrespirable, and uninflammable gas, resembling somewhat in odor hydrochloric acid. Dissolved in water, it forms a clear, limpid solution, with an acid reaction, and rather a pungent, styptic taste; but quickly decomposes upon exposure to the air, the solution becoming colored by free iodine. It may be obtained, however, in a

stable form as a syrup. The syrup of hydriodic acid is of
light-straw color, free from smell, with a sweet, stypti
though not disagreeable, taste. The dose usually ordered
from one to three drachms in water, several times a day.]

[IODOFORMUM—IODOFORM.

In yellow, scaly crystals having the odor of saffron. It is insoluble in wat
but soluble in alcohol, ether, and the fixed and volatile oils. By a h
above 250° *it is decomposed, giving off violet vapors.*
(CHI_3; 392.8.)

Unguentum Iodoformi (10 per cent.).

It is prepared by decomposing an alcoholic solution
iodide of potassium with lime. As a local anæsthetic, i
applied in powder to *painful ulcers*, whether chronic, c
cerous, or syphilitic, where it relieves pain and promo
cicatrization. Suppositories (gr. v–x) are used in *hæm*
rhoids and *uterine cancer*. In ethereal solution (20
cent.), it has been highly recommended as an application
chronic inflammation of the throat.[1] Its abominable o
almost precludes its use outside of the hospital wards.]

Iodoform is not much used internally, on account of
disagreeable taste and tendency to produce iodism.

Experiments on animals have shown that it produces f
degeneration of the heart, liver, and kidneys, and death w
symptoms of general paralysis.

It is, however, an excellent local application, being a
thetic in its properties, although its first application ca
smarting.

When applied to the surface of the body, dissolved in
lodion, it reduces the temperature.

It is an admirable application to venereal sores, chr
ulceration of every kind, including diphtheria and can
rupial sores, bubos, and indolent sinuses, throat ulcerati
ozæna, subacute eczema, and post-nasal catarrh, catar
inflammation of the tympanum and Eustachian tube,
purulent conjunctivitis.

It may be used in powder, as an ointment with vas
(1 to 4), the odor being concealed by some aromatic

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[1] (Phil. Med. Times, vol. iv. p. 4, 1873.)

and especially balsam of Peru and musk, dissolved in chloroform, which is its best solvent; or as iodoformed wool.

℞. Iodoformi	gr. i;	or	0.6 Gm.
Balsami Peruviani	gr. ii;	"	13 "
Petrolati	gr. viii;	"	50 " M.

Fiat unguentum.

IPECACUANHA—IPECAC.

[*The root of Cephaëlis Ipecacuanha, A. Richard (N. O. Rubiaceæ Coffeæ).*

Officinal Preparations.

Extractum Ipecacuanhæ Fluidum. Dose, gtt. xxx (2. Gm.).

Pulvis Ipecacuanhæ et Opii. Dover's powder (Ipecac. gr. j; opium gr. j; sulph. potass. gr. viij). Dose, gr. x (.65 Gm.).

Trochisci Ipecacuanhæ (gr. $\frac{1}{4}$ in each).

Trochisci Morphinæ et Ipecacuanhæ (Morphine gr. $\frac{1}{40}$; ipecac. gr. $\frac{1}{12}$).

Syrupus Ipecacuanhæ (Extract f℥ij to syrup xxx). Dose, fʒij–f℥ss (2 to 16. Gm.).

Vinum Ipecacuanhæ (f℥ij extract to sherry wine f℥xxx). Dose, fʒj–iv (4. to 16. Gm.).]

Local Actions.

Physiological.

The prolonged application of ipecacuanha to the skin causes some irritation, followed by the appearance of vesicles, pustules, and even troublesome ulceration. In some persons the powdered root causes violent irritation of the respiratory passages, ranging from symptoms resembling hay-fever up to a spasmodic condition analogous to true asthma.

Therapeutical.

The use of the slowly acting and pustulating forms of counter-irritation has fallen out of fashion, as they are not only disfiguring, but give less relief than more sedative applications.

The only way in which we find ipecacuanha employed locally is in the form of spray, which Prof. Ringer has found very useful in *chronic bronchitis*, *winter cough*, *bronchial asthma*, with *emphysema* and *fibroid phthisis*. As the pure wine may cause nausea and irritation, he devises a dilution with from one to two parts of water, using the ordinary spray-producer, beginning with about twenty squeezes for the first sitting, once a day, but afterwards more frequently repeated, the mouth being well rinsed out after each application. Cases of winter cough were generally cured in twelve days.

CONSTITUTIONAL ACTIONS.

1. *Brain and Nervous System.*—1. No effect seems to be produced on the brain.

2. Ipecacuanha has a markedly stimulating influence on that centre in the medulla oblongata which presides over the action of vomiting. It has been found, by experiment, to cause diminution of tactile sensibility and paralysis of the arms or fore-legs, not unlike glosso-pharyngeal paralysis, and probably depending upon exhaustion of the medulla by the vomiting act. Whether by subcutaneous injection, or by being taken into the stomach, it causes, within a moderate period, a decided but mild emetic effect; and as this may arise either from irritation of the mucous membrane of the stomach, or from a primary

2. Ipecacuanha cannot be recommended in cases of poisoning, for not only does it act too slowly, but its nauseating and depressing influence may be injurious. It is of great service, however, in many of those affections of the throat or respiratory organs where we wish to empty the lungs or detach foreign bodies or false membranes from the larynx or trachea, as in *bronchitis*, *croup*, *diphtheria*, etc.

A most remarkable fact in the action of this drug is its power, when given in small doses, of checking *vomiting*. Thus, in the vomiting of pregnancy, suckling, or menstruation; in the iritability stimulation of the vomiting centre itself, ipecacuanha must be ranked among both the direct and the indirect emetics.

Emetine given by subcutaneous injection is much slower in its action, and requires to be given in larger doses than by the mouth, which proves that it must primarily act on the gastric mucous membrane.

It may be said generally to occupy a middle place between sulphate of zinc and tartar emetic, being neither so prompt as the first, nor so nauseating as the second.

II. *Circulation.*—Ipecacuanha has no direct influence on the heart or circulation, save the usual depression following nausea and vomiting. Emetine acts almost like ammonia in dissolving the red corpuscles of the blood.

III. *Respiration and Temperature.*—No effect is produced on the rapidity of the respiratory function, save the temporary acceleration usually accompanying the act of vomiting. There seems no doubt, however, that ipecacuanha causes an increased secretion from the mucous membrane of the bronchial tubes. After poisoning by ipecacuanha, the lungs have generally been found in a bloodless condition in the early stages, intense conges-

of stomach of children, and in other dyspeptic conditions in which nausea or vomiting is a prominent symptom, a drop of ipecacuanha wine, taken every hour, will often prove truly curative. At present this must be looked upon as one of the enigmas of therapeutics.

III. Ipecacuanha is therefore a most useful expectorant, thinning and diluting the pulmonary mucus, and thus facilitating its expulsion. It is hence almost universally employed in ***bronchitis*, *common catarrh*, *winter cough***, etc. It was formerly used, and with some alleged success, in ***hæmoptysis***, 5-grain doses repeated at short intervals exerting a marked depressing effect, and thus checking the tendency to bleeding; but with the introtion following its more prolonged action.

IV. *Digestive and Secreting Organs.*—1.—*Stomach and Intestines.*—As already noted, ipecacuanha causes some irritation of the terminal filaments of the pneumogastric nerve distributed to the stomach, and thus sets in motion the reflex machinery necessary to produce vomiting. On the mucous lining of the intestinal canal, also, its effects are undoubted, as indicated by its action in disease; but we are at present unable to give any satisfactory explanation of its often marvellous influence over dysentery in its various forms.

duction of more effectual
medies, this mode of tr
ment has now fallen into
use.

IV. 1. Ipecacuanha
emetic dose is indicated
some overloaded condit
of the stomach, caused
excessive indulgence ei
in food or drink; and
dull aspect, coated ton
foul breath, headache,
nausea, may be promptl
lieved in this way.

In *acute dysentery*, ip
cuanha is now looked up
a never-failing specific.
must here be taken in
doses, from sixty to ni
grains being given at
this vigorous medication
cutting short the disease

Let the patient re
very quietly on his bac
at least 10 or 12 hours b
repeating the dose, and
then we must be guide
symptoms. Although
first dose may be reject
the stomach, toleratio
speedily established, an
more vomiting is prod
Some authorities recom
a previous administrati
laudanum to quiet the
ach. [The same trea
has been found advanta
in the purging of *c*
morbus.]

Under this treatmen
pain and tenesmus r
subside, the motions
natural color and consis

and the patient makes a satisfactory recovery.

In cases of *dysenteric diarrhœa* so often met with in this country, and more especially in children, ipecacuanha in much smaller doses is also a very effectual remedy, the indications for its use being any appearance of blood or mucus in the stools, with pain and straining. In the more ordinary forms of diarrhœa, however, it is quite useless.

2. *Liver.* — Ipecacuanha is a powerful hepatic stimulant. It increases slightly the secretion of intestinal mucus, but has no other apparently stimulating influence on the intestines. The bile secreted under its influence has the normal composition. (Rutherford.)

2. It has therefore been given in the form of pill, and combined with other remedies, to relieve the *sluggish digestion* caused by a deficiency of bile.

3. *Skin.* — Ipecacuanha promotes slightly the cutaneous secretion, independently of the tendency to perspiration usually attending the action of emetics.

3. Ipecacuanha combined with opium, in the form of "Dover's Powder," is a well-known and tolerably effectual diaphoretic, much used in *chronic rheumatism* and feverish attacks.

MODE OF ELIMINATION, ETC.

It is probable that as much of the ipecacuanha as remains after the action of vomiting is eliminated from the system by the biliary and intestinal secretions.

MODE OF ADMINISTRATION.

The action of ipecacuanha wine is so notoriously uncertain, that, when we wish to obtain the full emetic effect of the drug, it is best to have recourse to the freshly powdered root (15 to 30 grains, or 1. to 2. Gm.), remembering, however, that children will bear unusually large doses.

In the treatment of dysentery, also, we shall derive most advantage from the use of the powder; and in ordinary cases of dysenteric diarrhœa we may give from $\frac{1}{2}$ to 2 or 3 grains in combination with compound tragacanth powder. (P. Br.)

Vinum ipecacuanhæ, in doses of from ♏x to ℥j, is an almost invariable ingredient of cough mixtures.

[Emetine, the alkaloid of ipecacuanha, is not officinal, but is an efficient emetic in doses of gr. $\frac{1}{12}$ to $\frac{1}{6}$ (.005 to .01 Gm.).]

JALAPA—JALAP.

[*The tuberous root of Exogonium purga, Bentham (N. O. Convolvulaceæ).*

Dose, in substance, gr. x–xxx (.60 to 2. Gm.).

OFFICINAL PREPARATIONS, U. S.

Abstractum Jalapæ. Dose, gr. v–x (.30 to .65 Gm.).

Pulvis Jalapæ Compositus (jalap 35 parts, cream of tartar 65 pts.). Dose, gr. xx–℥j (1.30 to 4. Gm.).

Resina Jalapæ. Dose, gr. ij–iv (.12 to .25 Gm.).]

Physiological Action.

The action of jalap resembles that of scammony, only differing in being less irritant and more effectual in promoting the flow of watery fluids from the bowels.

Rutherford points out that it is a "moderately powerful hepatic, and a powerful intestinal stimulant."

Therapeutical Action.

Jalap is undoubtedly one of our best hydragogue cathartics, and is much used in cerebral lesions, in *kidney disease*, where the excretion of effete products threatens to become suspended, and when dropsy is setting in; in such cases smart purgation by pulv. jalap. co. will often produce striking benefit.

In *cardiac disease*, also, when the right side of the heart is engorged by *emphysema* or *bronchitis*, free catharsis will unload the distended and laboring organ, and relieve the condition of

[illegible]

intense dyspnœa, with the cold and livid surface and indications of approaching death. Jalap also acts well as an ordinary or habitual purgative, and is generally prescribed in the form of the compound powder, containing cream of tartar and ginger.

[The abstract of jalap is one of the constituents of the officinal compound cathartic pill.]

[JUGLANS—BUTTERNUT.

The inner bark of the root of Juglans cinerea, Linné (N. O. Juglandaceæ), collected in autumn.

Officinal Preparation, U. S.

Extractum Juglandis. Dose, as a laxative, gr. v–x; as a purgative, gr. xx–xxx (.30 to 2. Gm.).

Juglans is an indigenous cathartic resembling rhubarb in its property of evacuating without debilitating the bowels. Mild and efficient in its action, it is well adapted to *habitual constipation.* It may be given in decoction, or in the form of the officinal extract.]

JUNIPERUS—JUNIPER.

[The fruit of Juniperus communis.

Officinal Preparations, U. S.

Oleum Juniperi. Dose gtt. v–xv (.30 to 1. Gm.).

Spiritus Juniperi Compositus (Oil of juniper 10, oil of caraway and fennel of each 1, alcohol 3000, water q. s. ad 5000 parts). Dose, f℥ij–iv (8. to 16. Gm.).

Spiritus Juniperi (oil 3 per cent.). Dose, f℥ss–j (2. to 4. Gm.).]

Physiological Action.	*Therapeutical Action.*
Juniper stimulates the action of the kidneys, but, like	Juniper is a good diuretic, generally used in combina-

many other remedies of its class, only increases the flow of urine where dropsy exists. It has been shown that in a healthy man the quantity of the urine is actually diminished, whilst the urea is increased.

[When an overdose is given, even strangury and total suppression may result. In small doses it is a gentle stimulant and stomachic.]

tion with other drugs, and acting either when swallowed, or inhaled in the form of vapor.

[Gin, made by steeping juniper berries in spirits, is not officinal, but the Compound Spirits of Juniper may be considered as its equivalent. Commercial gin is said to sometimes contain oil of turpentine.]

℞ Spiritus juniperi	f℥ss;	or	16	Gm.	
Potassii acetatis	ʒiss;	"	6	"	
Spiritus ætheris nitrosi	f℥j;	"	32	"	
Decocti scoparii [Br.]	f℥viij;	"	256	"	M.

S. Dose, f℥j ter die.

Diuretic mixture.

KAMALA—KAMALA (ROTTLERA, U. S. P. 1870).

[*The glands and hairs from the capsules of Mallotus philippinensis, Mueller Arg.* (*N. O. Euphorbiaceæ*).

Dose, ʒj–iij (4. to 12. Gm.).]

EFFECTS.

Physiological.	*Therapeutical.*
Kamala is a vermicide, killing the tape-worm rapidly; it also possesses purgative properties.	Kamala is an efficient anthelmintic, differing from other remedies of the class in its cathartic action.

KINO—KINO.

[*The inspissated juice of Pterocarpus Marsupium, Roxburgh (N. O. Leguminosæ, Papilionaceæ).*

OFFICINAL PREPARATION.

Tinctura Kino. Dose, fʒj–ij (4. to 8. Gm.).]

Physiological Action.	*Therapeutical Action.*
Kino is astringent in virtue of the tannin which it contains.	It may therefore be used in *diarrhœa* and other cases where astringents are indicated, but it seems to have no special advantage over other remedies of the same class.

KRAMERIA—KRAMERIA (RHATANY).

[*The root of Krameria triandra, Ruiz et Pavon, and of Krameria Tomentosa, St. Hilaire (N. O. Polygalaceæ, Kramerieæ).*

Dose in substance, gr. v–xx (.32 to 1.30 Gm.).

OFFICINAL PREPARATIONS, U. S.

Extractum Krameriæ. Dose, gr. v–x (.30 to .65 Gm.).

Trochisci Krameriæ (each 1 grain of extract).

Extractum Krameriæ Fluidum. Dose, gtt. xx (1.30 Gm.).

Syrupus Krameriæ (35 per cent.). Dose, ʒj–iv (4. to 15. Gm.).

Tinctura Krameriæ (20 per cent.). Dose, fʒj–ij (4. to 8. Gm.).]

Physiological Action.	*Therapeutical Action.*
Krameria has powerful astringent properties, due, no doubt, to the tannin which it contains. [It is also gently tonic, and is much esteemed	Rhatany has been used with success in ***dysentery*** and *diarrhœa*, but is probably inferior to many other remedies of the same class, and

in Peru in treatment of bowel affections.]

is therefore but seldom ployed. [It is freque added to chalk mixture the treatment of diarrho relaxation.]

[LACTUCARIUM—LACTUCARIUM.

The concrete milk juice of Lactuca Virosa, Linné (N. O. Composi

Dose, gr. xx (1.30 Gm.).

Officinal Preparations, U. S.

Extractum Lactucarii Fluidum. Dose, ♏x- (0.65 to 2. Gm.).

Syrupus Lactucarii (5 per cent.). Dose, f (4. to 12. Gm.).

Lactucarium, or Lettuce-opium, is a feeble narcotic is considered slightly laxative and diuretic. It has used as a substitute for the other narcotics in *phthisis* in *diseases of children.*]

LAPPA—LAPPA (BURDOCK).

[*The root of lappa officinalis (N. O. Compositæ).*

Dose, ʒj–iv (.4 to .8 Gm.).

Burdock root contains a bitter principle, with a littl nin and volatile oil. The fluid extract or decoction has used in chronic rheumatism, skin diseases, dyspepsia,

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[LAVANDULA—LAVENDER.

The flowers of Lavandula vera, De Candolle (N. O. Labiat

Officinal Preparations, U. S.

Oleum Lavandulæ. Dose, gtt. iij–x (.20 to .60

Spiritus Lavandulæ. Dose, fʒss–j (2. to 4. Enters into Mistura Ferri Composita.

Tinctura Lavandulæ Composita. Dose, (2. to 4. Gm.).

Oleum Lavandulæ Florum (from fresh laven

Spiritus Odoratus. Cologne water, for external use as a perfume.
Vinum Aromaticum (see page 95).

Lavender is a carminative, but is rarely used except in combination. The compound tincture is its most elegant preparation, and is a very agreeable stomachic and cordial. The oil is used in perfumery. It enters into the officinal Liq. Potassii Arsenitis, and Spiritus Ammoniæ Ammoniaticus.]

LEPTANDRA—LEPTANDRA.

[*The rhizome and rootlets of Leptandra Virginica, Nuttall (Veronica Virginica, Linné), (N. O. Scrophulariaceæ).*

Officinal Preparations.

Extractum Leptandræ. Dose, gtt. iij–x (0.20 to 0.65 Gm.).
Extractum Leptandræ Fluidum. Dose, ʒss–j (2. to 4. Gm.).

Culver's root is emetic and cathartic, and is also considered cholagogue. Dose of the powdered root, gr. xx to ʒj (1.32 to 4. Gm.). In small doses (gr. ij–v, or .12 to .30 Gm.) it is said to resemble rhubarb. The fluid extract is aperient in doses of ♏x to fʒj (.60 to 4. Gm.).]

LIMONES—LEMON.

[*The rind of the recent fruit of Citrus Limonum, Risso (N. O. Aurantiaceæ).*

LIMONIS SUCCUS—LEMON JUICE.

[*The freshly expressed juice of the ripe fruit of Citrus Limonum, Risso (N. O. Aurantiaceæ).*

Officinal Preparations, U. S.

Oleum Limonis.
Spiritus Limonis. Used for flavoring purposes.
Mistura Potassii Citratis. Neutral mixture. Dose, f℥ss–ij (16. to 64. Gm.).
Syrupus Limonis. As a vehicle.

Spiritus Ammoniæ Aromaticus. Dose, fʒ
(2. to 4. Gm.).

Syrupus Acidi Citrici. As a vehicle.]

CONSTITUTIONAL ACTION.

Lemon-peel is in some measure tonic and anti-spasm
and is a useful flavoring ingredient, but lemon-juice has
important properties which are purely therapeutical,
cannot be explained by any action which it possesses
the healthy organism.

In the first place we must rank its antiscorbutic vir
acting as it does both by preventing and by curing the
ease, and by its universal use afloat nearly stamping out
ravages of what used to be an almost invariable attenda
long voyages at sea. The occurrence of *scurvy* to any
tent on board ship is now looked upon as a clear indic
that the regular administration of lime or lemon-juice
been neglected, and that the crew has been attacked
painful and dangerous disease, the absolute preventabili
which experience has amply confirmed. Various exp
tions have been given of the cause of scurvy, and there
doubt that it is usually associated with an absence of
meat and vegetables from the diet scale. Dr. Garrod,
ever, goes further, and teaches that the essence of the
ease lies in a deficiency of the potash salts; whilst
Morgan, of Dublin, is no less convinced that the abse
phosphoric acid is the real cause—both agreeing in
however, that the presence of this special ingredie
lemon-juice explains its superiority over citric acid, wh
in no degree an antiscorbutic. It is unfortunate that
juice is bulky, and liable to become solid at low tem
tures, and must be also administered in such conside
doses as to give some excuse for its occasional negle
expeditions where every ounce of extra weight entai
creased toil and danger. It is to be hoped that some
convenient and portable means of using this invaluable
may yet be introduced.

Lemon-juice was formerly vaunted as a specific for
rheumatism, and although this has not been confirm
experience, there is no doubt that persons afflicted
chronic rheumatic pains may often derive benefit
taking a tablespoonful of this agreeable remedy two or

times a day with their meals. Lemon-juice has also been called a refrigerant, but its sole claim to this title rests upon the great facility with which we may construct refreshing effervescing draughts by its aid. Quite recently, however, some good authorities have praised it highly as an antipyretic in ague, given as a decoction of the freshly plucked fruit.

[See CITRIC ACID, page 113.]

[**Linimenta.**

The officinal LINIMENTS are—

Linimentum Ammoniæ
" Belladonnæ
" Calcis
" Camphoræ
" Cantharidis

Linimentum Chloroformi
" Plumbi Subacetatis
" Saponis
" Sinapis Compositum
" Terebinthinæ.]

LINUM—FLAXSEED (LINSEED).

[*The seed of Linum usitatissimum (N. O. Linaceæ).*

Oleum Lini. Flaxseed oil (Linseed oil). Ext. use.]

LOCAL ACTION.

Physiological.

Linseed meal, in the form of poultice, is the most convenient and effectual way of applying continuous, moist warmth to the surface of the body. Thus used, it relieves pain, relaxes spasm, and is generally soothing and agreeable to the feelings of the patient. By relaxing the superficial vessels, a poultice may be in some measure antiphlogistic, and may also relieve the congestion of internal organs by drawing blood to the cutaneous surface and promoting perspiration there.

Therapeutical.

A linseed poultice is a very soothing and effectual application in all acute affections of the lungs. Not only does it relieve pain, but it keeps up a warm equable temperature and rests the affected organ by restricting in some degree the movements of the chest walls. It may also be used with advantage in *peritonitis*, in *colic*, in various inflammatory affections of the throat, and in *boils*, *abscesses*, etc., where, if it does not succeed in arresting the suppurative process, as occasionally

happens, it facilitates
hastens the breaking do
inflammatory products
pus, and thus encourage
process of ripening.
the opening of the ab
poultices cannot be re
mended, as they are nau
and dirty, and we would
rather advise the case
treated on the antiseptic
ciples of Mr. Lister.

Linseed oil is an old-
ioned treatment for *b*
and, combined with
water, was formerly e
sively used under the
of Carron oil.

INTERNAL USE.

An infusion of linseed is rather soothing in character, probably owing to the mucilage which it contains.

Under the name of li
tea, this infusion is
used in domestic medic
a soothing remedy for co

MODE OF ADMINISTRATION.

When used as an application in pleurisy or pneumo
poultice must extend fairly round the chest; it shou
about a quarter of an inch thick, and must be chang
seldomer than every two hours, as it soon tends to b
dry, hard, and uncomfortable. It is best made by
sprinkling the meal into boiling water, stirring vigo
meanwhile, and afterwards incorporating with it a c
amount of olive oil, which prevents its adhering t
surface. [A piece of oiled silk should be placed outs
the poultice to retain its warmth and moisture.] Occ
ally its use seems to irritate the skin, and cause a c
small boils and painful pustules, and it must, therefore
general rule, be avoided in most cutaneous affections.

[Liquores.

The officinal SOLUTIONS are—

Liquor Acidi Arseniosi
" Ammonii Acetatis
" Arsenii et Hydrarg. Iodidi
" Calcis
" Ferri Acetatis
" " Chloridi
" " Citratis
" " et Quininæ Citratis
" " Nitratis
" " Subsulphatis
" " Tersulphatis
" Gutta-perchæ
" Hydrargyri Nitratis
Liquor Iodi Compositus
" Magnesii Citratis
" Pepsini
" Plumbi Subacetatis
" " " Dilutus
" Potassæ
" Potassii Arsenitis
" " Citratis
" Sodæ
" " Chloratæ
" Sodii Arseniatis
" " Silicatis
" Zinci Chloridi.]

LITHIUM.

[**Lithii Benzoas.** Benzoate of lithium. Dose, gr. v–xx (0.30 to 1.30 Gm.).

Lithii Bromidum. Bromide of lithium. Dose, gr. v–xx (0.30 to 1.30 Gm.).

Lithii Carbonas. Carbonate of lithium. Dose, gr. iij–vj (.20 to .40 Gm.).

Lithii Citras. Citrate of lithium. Dose, gr. v–x (.30 to .65 Gm.).

Lithii Salicylas. Salicylate of lithium. Dose, gr. v–xxx (0.30. to 2. Gm.).]

Physiological Effects.	*Therapeutical.*
Lithia forms a very soluble salt with uric acid, probably in the blood, and, therefore, prevents the deposition of chalky formations in the tissues.	Lithia is, therefore, a valuable remedy for *gout*, and uric acid *gravel*, given either in the form of effervescing lithia water, lithii carbonas, lithii citras, or the benzoate which is Garrod's favorite preparation.
It also causes an increase in the urinary secretion.	It, therefore, acts as a diuretic perhaps more powerfully than any of the other alkaline salts.

LOBELIA—LOBELIA.

[*The leaves and tops of Lobelia inflata (N. O. Lobeliaceæ) collected after a portion of the capsules have become inflated.*

OFFICINAL PREPARATIONS, U. S.

Acetum Lobeliæ (10 per cent.). Dose, from gtt. x to fʒj–ij (.65 to 8. Gm.).

Tinctura Lobeliæ (20 per cent.). Dose, ♏v to ʒj (0.30 to 4 Gm.).

Extractum Lobeliæ Fluidum. Dose, ♏v–xx (0.30 to 1.30 Gm.).

ANTIDOTES.

The stomach should be washed out with warm solution of tannic acid, and symptoms of collapse treated as they arise, by stimulants, friction, counter-irritants, sinapisms, and anodynes.]

LOCAL ACTION.

Lobelia possesses no local action.

INTERNAL ACTIONS.

Physiological.	*Therapeutical.*
1. *Brain and Nervous System.*—In large doses, lobelia frequently causes headache and giddiness, and may eventually extinguish life by paralyzing the respiratory centre.	
2. *Heart and Circulation.*—Lobelia depresses the action of the heart, and in this respect has a powerful affinity to tobacco.	
3. *Respiration and Temperature.*—As already mentioned, lobelia in large doses is a respiratory depressant, but in ordinary medical prac-	3. Lobelia is only used in medicine in this country as a remedy for various respiratory affections, and more especially *spasmodic asthma.*

tice it seems to relieve spasmodic conditions of the bronchial tubes. It lowers the temperature in some measure, on account of its diaphoretic action.	Its action here is apt to be uncertain, and it may unexpectedly cause much nausea and discomfort; but Ringer tells us that we may employ it with great confidence by giving much larger doses than are usually prescribed. Remember that its action in no way prevents the asthmatic attack, but merely cuts it short.
4. *Secreting and Digestive Organs.* — Lobelia has undoubted emetic properties, and frequently causes vomiting, accompanied by much nausea and general depression. *Skin.*—Lobelia excites the action of the skin. *Kidneys.*—Lobelia is said to promote the excretion of watery fluids by the kidneys.	4. Lobelia is never used as an emetic, being slow, uncertain, harsh, and exhausting.

DOSE.

Ringer tells us that the dose laid down in our usual text-books is much too small, and that we may freely administer a drachm of the tincture every hour, or ten minims every ten minutes, with advantage, immediately before and during the asthmatical paroxysm. [The vinegar of lobelia is said to be the best preparation for internal use.]

The great drawback to its use is the occasional unpleasant symptoms following its administration, and which can be, unfortunately, neither foreseen nor prevented.

[LUPULINUM—LUPULIN.

The glandular powder separated from the strobiles of Humulus Lupulus, Linné (N. O. Urticaceæ, Cannabineæ).

(See HUMULUS, page 323.)]

[LYCOPODIUM—LYCOPODIUM.

The sporules of Lycopodium clavatum, Linné, and of other speci
Lycopodium (N. O. Lycopodiaceæ).

Lycopodium is an extremely light, very fine powder,
delicate yellow color, inodorous, tasteless, and very in
mable, so that it flashes like gunpowder when thrown
the flame. It is used as a dusting powder for chafing
should not be used when the skin is broken. It is also
ployed to coat pills in pharmacy.]

MACIS—MACE.

[*The arillus of the fruit of Myristica fragrans, Houttuyn*
(N. O. Myristicaceæ).

(See under NUTMEG, page 375.)

MAGNESIA.

OFFICINAL PREPARATIONS, U. S.

[**Magnesii Carbonas.** Carbonate of Magne
Dose, ʒss–ʒij (2. to 8. Gm.).

Magnesii Sulphas. Sulphate of Magnesium.
som salt.) Dose, ℥ss–j (16. to 32. Gm.).

Magnesii Sulphis. Sulphite of Magnesium.
gr. xv–xxx (1. to 2. Gm.).

Magnesia. Light Magnesia. Dose, ʒj–iv (4. t
Gm.).

Trochisci Magnesiæ (each containing gr. iij).

Liquor Magnesii Citratis. Dose, f℥ij–viij (
2.40 Gm.).

Magnesia Ponderosa. Heavy Magnesia.
ʒss–ij (2. to 8. Gm.).

Ferri Oxidum Hydratum cum Magnesia.
IRON.)

Pulvis Rhei Compositus. (See RHUBARB.)

Mistura Magnesiæ et Asafœtidæ. Dewees's
minative. (Magnes. carb., 5; tr. asafœtid., 7; tr. opiu
sugar, 10; water q. s. ad 100 parts.) Dose, ʒss–j (2
Gm.).

Magnesii Citras Granulatus. Granulated Ci
Dose, ʒj–iv (4 to 16 Gm.).]

INTERNAL USES.

Magnesia and its carbonate have a great capacity for saturating and neutralizing acid, and secondly, on becoming converted into bicarbonate by the carbonic acid of the intestines, they produce a mildly laxative effect.

Sulphate of magnesium acts much more powerfully, and causes profuse watery evacuations, and its action may be thus explained:—

In virtue of its low diffusive power, it does not readily find its way into the blood, but remaining in the intestines, it attracts and firmly retains the watery fluid it finds there, and thus prevents its reabsorption. But in addition to this, and to increasing the intestinal secretion, recent experiment has shown that it also actually withdraws fluid from the veins, as proved by the rapid way in which a small portion of intestine isolated from the rest of the tube becomes filled with watery fluid after the introduction of sulphate of magnesium.

That this is not entirely due to exosmosis is rendered probable by the fact that the blood contains a greater proportion of saline matter than many mineral waters, besides which we know that albuminous or colloidal solutions like

They are therefore antacid, and relieve pain or *heartburn*, and are also gentle purgatives, much used, more especially for children. Their tendency, however, to form concretions, when employed too long, limits their use in this respect.

Sulphate of magnesium is a very commonly used purgative in doses of from ʒj to ℥ss in simple constipation, in the early stages of smallpox and feverish conditions, in *chronic lead-poisoning*, and combined with iron, in many atonic conditions of the system.

[Dr. Matthew Hay has shown that *pleural* and other serious effusions may be rapidly carried off by the administration of sulphate of magnesium, at the same time restricting the amount of fluid drunk.]

It has been credited with cholagogue properties, but Rutherford has shown, on the contrary, that it actually lessens the hepatic secretion. The principal mineral waters containing this salt are Birmenstorf in Switzerland, serum dialyze with difficulty, so that the exosmosis ought in reality to be from the intestine towards the blood. The experiments of Rutherford have shown that mag. sulph. is a powerful stimulant to the intestinal glands; an action which may be at once checked by paralyzing the sensibility of the gut by a little laudanum.

Pullna in Bohemia, Sei
and Friedrichshall in Sax

MODE OF ADMINISTRATION.

As sulphate of magnesium is not only very nauseous, when taken alone, may cause griping, straining, or unc fortable abdominal distension, it is usually prescribed in c bination with senna, cardamom, and licorice, as in mist. sennæ co. [Br.], or with a little acid and sulphat iron, both of which seem to increase its purgative propert and it is well to remember that free dilution also seem enhance its effects. The following are good formulæ:—

℞. Magnesii sulphatis	℥ij;	or 64	Gm.	
Syrupi zingiberis	f℥ss;	" 16	"	
Infusi rosæ q. s. ad	f℥viij;	" 256	"	M

S. ℥j tertis horis.

℞. Magnesii sulphatis	℥ij;	or 64	Gm.
Ferri sulphatis	gr. xxxiv;	" 1.60	"
Acidi sulphurici diluti	fʒij;	" 8	"
Infusi quassiæ q. s. ad	f℥viij;	" 256	"

Misce, fiat mistura, cujus capiat unciam unam omni mane.

℞. Magnesii sulphatis	℥ij;	or 64	Gm.
Magnesii carbonatis	ʒij;	" 8	"
Syrupi zingiberis	f℥j;	" 23	"
Aquæ ment. piperitæ q. s. ad	f℥viij;	" 255	"

Misce, fiat mistura. Sumat unciam unam quartis horis effectum, phialâ priùs bene agitata.

MAGNOLIA—MAGNOLIA.

[*The bark of Magnolia glauca, Magnolia acuminata, and Magnol tripetala, Linné (N. O. Magnoliaceæ).*

This drug has been introduced into the Pharmacopœia the effort to extend the knowledge of our indigenous Mat

Medica. It contains a bitter neutral principle, Magnolin, which is crystallizable; insoluble in water, but soluble in alcohol. A fluid extract made with the aid of alcohol can be used as a bitter, aromatic tonic, in doses of ♏xxx–fʒjss (2. to 6. Gm.).]

MALTUM—MALT.

[*The seed of Hordeum distichum (N. O. Graminaceæ) caused to enter the incipient stage of germination by artificial means and dried.*

Extractum Malti (Extract of Malt). Dose, ʒj–iv (4 to 16 Gm.).

The extract of malt contains malt sugar, dextrose, and diastase. It is therefore useful as an easily assimilable food, and assists in the digestion of carbo-hydrates. It is usually given in combination with milk. The imported German malt extract is an alcoholic preparation and can be used where a little alcohol is needed to stimulate gastric digestion.]

[MANGANI OXIDUM NIGRUM.

Native crude Binoxide of Manganese containing at least 66 per cent. of the pure oxide.

(MnO_2=86.)]

MANGANI SULPHAS—SULPHATE OF MANGANESE.

Dose, gr. v–xx (.30 to 1.30 Gm.).

INTERNAL EFFECTS AND USES.

Sulphate of manganese acts as a purgative in doses of ʒj–ij (4. to 8. Gm.), and in smaller doses has cholagogue properties. It has been used as a substitute for iron, as a *hæmatinic.* Dr. Hammond reports its successful use in *chorea.* In divided doses it has been given in *gastralgia, pyrosis,* and *indigestion.* The binoxide has been given internally in *dysmenorrhœa* due to defective supply of blood to the ovaries. Dose, gr. v–xx (0.30 to 1.35 Gm.).]

MANNA—MANNA.

[*The concrete saccharine exudation of Fraxinus Ornus, Linné*
(*N. O. Oleaceæ*).

Infusum Sennæ Compositum. Black Dra
(Senna 6; manna 12; magnes. sulph. 12; fœnic. 2; boi
water q. s. ad 100 parts). Dose, ℥j–iv (32 to 120 Gm.

Internal Effects and Uses.

Has very slight purgative properties. [It is gener
given in infusion combined with senna, but may be
alone boiled in milk for children, to whom its sweet
makes it acceptable. Dose for a child, ʒj–iij (4. to
Gm.).]

[MARRUBIUM—HOREHOUND.

The leaves and tops of Marrubium vulgare, Linné (*N. O. Labiata*

Used as a domestic remedy for coughs and colds and
diaphoretic, in the form of decoction (℥j to Oj), syrup,
candy.]

[MASSÆ—MASSES.

The officinal Masses are Massa Copaibæ, Massa
Carbonatis, and Massa Hydrargyri.]

MASTICHE—MASTIC.

[*A concrete resinous exudation from Pistacia Lentiscus, Linné*
(*N. O. Terebinthaceæ, Anacardieæ*).

Pilulæ Aloes et Mastiches. (See Aloes.)]

This is only used as a [temporary] filling for dec
teeth in dental surgery.

MATICO—MATICO.

[*The leaves of Artanthe elongata, Miquel (N. O. Piperaceæ).*

OFFICINAL PREPARATIONS, U. S.

Extractum Matico Fluidum. Dose, fʒss–j (2. to 4. Gm.).]

Tinctura Matico (10 per cent.). Dose ʒj to ij (4. to 8. Gm.).]

Matico is only used externally as a local application for the arrest of *hemorrhage ;* and it is generally believed that it acts mechanically by the roughly-reticulated under surface of the leaf entangling the blood and forming clots. No success has attended its internal administration. [In the form of the fluid extract, Matico has been used and recommended in *hemorrhages* and diseases of mucous membranes, including *gonorrhœa* and *leucorrhœa.*]

[MATRICARIA—GERMAN CHAMOMILE.

The flower-heads of Matricaria Chamomilla, Linné (N. O. Compositæ).

Resembles chamomile in its properties, but is rarely used in America.]

[MEL—HONEY.

A saccharine secretion deposited in the honey-comb by Apis mellifica, Linné (Class Insecta; Order Hymenoptera).

OFFICINAL PREPARATIONS, U. S.

Mel Despumatum. Clarified Honey. Used as a vehicle.

Confectio Rosæ. Used as a vehicle.

Mel Rosæ. Used as a vehicle.

Its agreeable taste and demulcent qualities make honey a useful vehicle for distasteful powders, and render it an acceptable addition to gargles. Purified honey is a good excipient for pills, and forms the basis of the Mellita, which are used chiefly in washes for the throat and mouth.]

[MELISSA—MELISSA (BALM).

The leaves and tops of Melissa officinalis.

Balm has a fragrant odor ; and an aromatic, bitter t it contains a volatile oil of an agreeable lemon-like odor resembles peppermint in its effects upon the stomach fluid extract would be the most eligible preparation giv doses of f℥j–ij (4 to 8 Gm.).]

[MENISPERMUM—MENISPERMUM (CANAD MOONSEED).

The rhizome and rootlets of Menispermum Canadense, Linné (N. O. ispermaceæ).

Contains berberine, and therefore has some tonic pr ties. In large doses it is laxative and diuretic. Dose, iv (4 to 16 Gm.), best given in the form of fluid extr

[MENTHA PIPERITA—PEPPERMINT.

The leaves and tops of Mentha piperita (N. O. Labiatæ).

MENTHA VIRIDIS—SPEARMINT.

The leaves and tops of Mentha viridis (N. O. Labiatæ).

Officinal Preparations, U. S.

Aqua Menthæ Piperitæ. Used as a vehicle.
Oleum Menthæ Piperitæ. Dose, gtt. iij–v (.2 .30 Gm.).
Spiritus Menthæ Piperitæ. Dose, gtt. x–xx to 1.30 Gm.).
Trochisci Menthæ Piperitæ. Dose 1 to 5.
Pilulæ Rhei Compositæ.
Vinum Aromaticum. (See page 95.)
Aqua Menthæ Viridis. Used as a vehicle.
Oleum Menthæ Viridis. Dose, gtt. iij–v (.2 .30 Gm.).
Spiritus Menthæ Viridis. Dose, gtt. x–xx 1.30 Gm.).]

Menthol, a crystalline solid, derived from Chinese and Japanese oil of peppermint, may be used with benefit as a local application in *neuralgia*, and other painful affections; and it has recently obtained a wide domestic popularity under the name of "neuralgic crystal."

[Peppermint and spearmint are favorite stimulant stomachics, and are much used as vehicles in mixtures. The trochees of peppermint are a popular carminative. The oil of peppermint is used sometimes as a counter-irritant in *neuralgia*, following the Chinese practice. Peppermint-water is an excellent application in cases of *pruritus pudendi*. It is rendered more effective by the addition of an alkali, thus: to a pint of water add a drachm of borax, and six or eight drops of oleum menthæ piperitæ. Mix and use as a lotion.]

MEZEREUM—MEZEREON.

[*The bark of Daphne Mezereum, Linné, and of other species of Daphne (N. O. Thymelaceæ).*

OFFICINAL PREPARATIONS, U. S.

Extractum Mezerei. External use.

Extractum Mezerei Fluidum (used in Ung. Mezerei).

Unguentum Mezerei (a stimulant dressing).]

Decoctum Sarsaparillæ Compositum. Dose, (see SARSAPARILLA.)

Extractum Sarsaparillæ Compositum Fluidum.

Linimentum Sinapis Compositum. (See MUSTARD.)

Only used in combination with other remedies, as sarsaparilla, guaiac, etc. It contains a bitter glucoside, *daphnine*, an acrid volatile oil, and resin. The powder is irritating and causes sneezing. In syphilis, scrofula, chronic rheumatism, and skin affections it has been used with asserted good results. Dose, gr. v–xv (.33 to 1. Gm.).

[Misturæ.

The officinal MIXTURES are—

Mistura Ammoniaci
" Amygdalæ
" Asafœtidæ
" Chloroformi
" Cretæ
" Ferri Composita
Mistura Ferri et Ammoni
tatis
" Glycyrrhizæ Com
" Magnesii et Asafœ
" Potassii Citratis
" Rhei et Sodæ.]

MOSCHUS—MUSK.

[*The dried secretion from the preputial follicles of Moschus Mos*
ferus, Linné (Class Mammalia, Order Ruminantia).

OFFICINAL PREPARATION.

Tinctura Moschi (10 per cent.). Dose, ʒss–j
4 Gm.).

INTERNAL EFFECTS.

Has undoubted antispasmodic powers, but has been
entirely discarded on account of its high price and fre
adulteration. It may be given in doses of gr. v–xv (.
1. Gm.), in *hysterical convulsions*, *hiccough*, in *low*
and *delirium tremens*. An efficient substitute for m
Castoreum, see page 205.]

Musk is stimulant and antispasmodic, and was for
much valued in France, and by Graves, of Dublin, in t
pneumonia, and other diseases tending to assume an
mic type; but it has now also fallen into comparative

[Mucilagines.

The officinal MUCILAGES are—

Mucilago Acaciæ
" Sassafras Medullæ
Mucilago Tragacanthæ
" Ulmi.]

MACIS—MACE.

[*The aryllus of the fruit of Myristica fragrans (Houttuyn, Nat. Hist.).*

MYRISTICA—NUTMEG.

The kernel of the seed of Myristica fragrans, Houttuyn, deprived of its testa (N. O. Myristicaceæ).

OFFICINAL PREPARATIONS, U. S.

Pulvis Aromaticus (Cinnamon 35, ginger 35, cardamom 15, and nutmeg 15).

Spiritus Myristicæ. Dose, f℥j (4. Gm.).

Oleum Myristicæ. Volatile oil of Nutmegs. Dose, gtt. ij–iij (.12 to .20 Gm.).]

Nutmeg enters into Acetum Opii, Pulvis Aromaticus, Spiritus Ammoniæ Aromaticus, Tinctura Lavandulæ Composita, Tinctura Rhei Aromatica, Trochisci Cretæ, Trochisci Magnesiæ, and Trochisci Sodii Bicarbonatis.]

Nutmeg is rarely used in medicine save as a flavoring ingredient. [The dose of Nutmeg or Mace in substance is gr. xv (1. Gm.). With its aromatic qualities, nutmeg unites considerable narcotic power, and in doses of ʒij–iij (8. to 12. Gm.) has produced stupor and delirium.]

MYRRHA—MYRRH.

[*A gum-resin obtained from Balsamodendron Myrrha, Nees (N. O. Burseraceæ).*

Dose, in substance, gr. x–xxx (.65 to 2. Gm.).

OFFICINAL PREPARATIONS, U. S.

Tinctura Myrrhæ (20 per cent.). Dose, f℥ss–j (2. to 4 Gm.).

Tinctura Aloës et Myrrhæ. Dose, f℥j–ij (4. to 8. Gm.). (See ALOES.)

Pilulæ Aloës et Myrrhæ. Rufus's Pills. (See ALOES.)

[illegible]

NUX VOMICA—NUX VOMICA.

[*The seed of Strychnos Nux Vomica, Linné (N. O. Loganiaceæ).*

Dose, in substance, gr. j–iv (.065 to 25 Gm.).

OFFICINAL PREPARATIONS, U. S.

Abstractum Nucis Vomicæ. Dose, gr. ½ to ij (.03 to .13 Gm.).

Tinctura Nucis Vomicæ (20 per cent.). Dose, ♏ v–xx (.30 to 1.30 Gm.).

Extractum Nucis Vomicæ. Dose, gr. ¼ to ½ (.015 to .03 Gm.).

Extractum Nucis Vomicæ Fluidum. Dose, ♏ j–iv (.06 to .25 Gm.).

Strychnina and **Strychninæ Sulphas.** Dose, gr. $\frac{1}{30}$ to $\frac{1}{12}$ (.002 to .005 Gm.).]

POISONOUS EFFECTS.

Strychnine kills by inducing hyper-excitability of the reflex functions of the spine, with violent tetanic spasms, leading to death by exhaustion or suffocation. The fatal event may take place in a few minutes if the dose be a large one, and the minimum quantity required to destroy life is about half a grain. Contrary to the habits of other poisonous drugs, strychnine acts most rapidly and efficiently when given by the rectum.

ANTIDOTES.

In a case of strychnine-poisoning, we may first administer tannin, which places the drug in an insoluble form, then, after evacuation of the stomach, it will be necessary to try the physiological antidotes. These are chloral, bromide of potassium, Calabar bean, and nicotine [or tobacco enemata], although the use of the last-mentioned remedy must be conducted with extreme caution. Finally we may have recourse to artificial respiration. [The Musculus Venenosus, a poisonous shell-fish, has been used by Dr. F. Crump, of Tralee, Ireland, in a case of traumatic tetanus with complete success. It produces complete loss of power in voluntary muscles (U. S. Dispensatory 1888, p. 1862). Possibly it might be useful in strychnine convulsions also.]

[Tests.

Strychnine may be recognized by rubbing a small
tion with a few drops of sulphuric acid containing one-
dredth of its weight of nitric acid. No change ensues;
the addition of a very small quantity of the peroxide of
or of bichromate of potassium, changes the solution to a
color, then to a red, and in the course of a few hours
yellow color. Commercial strychnine sometimes affor
red color, changing to a yellow, with nitric acid, owin
the presence of brucia.

Brucine is colored red by nitric acid, and this
changes to violet by the addition of protochloride of
With chlorine it gives a red color. Sulphuric acid first
dens brucine, and then turns it yellow and green.]

Local Action.

No special local action has been noted.

Constitutional Action.

1. *Brain and Nervous System.*—No effect is produced on the brain, the cerebral functions remaining unimpaired almost up to the close of a case of strychnine-poisoning.

The spinal cord, however, is early attacked, and violent and distressing tetanic spasms prove the irritating influence of the drug, more especially on the reflex excitability of that organ.

In large doses, strychnine also paralyzes the efferent (motor) nerves, causing loss of power of voluntary movement.

The sympathetic system is stimulated.

It probably stimulates the

1. Nux vomica, and
especially strychnine, ar
cellent nervine tonics, a
well in simple *debility*,
vous exhaustion, and *in*
nence of urine, and pr
ing the return of fun
after some forms of pa
sis. When all inflamm
symptoms have subs
strychnine may be presc
in the hope of stimul
the spine to resume its
and restoring tone to
cles which have long rem
in a state of inactivity.
in *paraplegia*, *hemip*
diphtheritic paralysis,
wrist-drop, strychnine
well go hand in hand
galvanism when all evi
of irritation of the ne

vaso-motor centre, raises the blood pressure, aids oxidation, and removes the products of waste, making the respiratory movements quicker and deeper.

2. *Heart and Circulation.*—Strychnine causes rise of arterial pressure and contraction of the capillaries.

3. *Respiration and Temperature.*—The interference with breathing observed in strychnine-poisoning, and which usually terminates the life of the victim, is due to spasmodic fixation of the diaphragm and respiratory muscles.

4. *Digestive and Secreting Organs.*—Strychnine has a tonic influence over the digestive process, aiding oxidation, removing the products of waste, and delaying putrefaction.

structures has completely disappeared. Trousseau, Hammond and Finny, of Dublin, praise it in chorea. Mr. Barwell has proposed subcutaneous injections of strychnine in infantile paralysis, using a large dose ($\frac{1}{18}$ to $\frac{1}{12}$ gr. (.005 Gm.), and forcing the fluid freely into the muscular structures.

Annandale, of Edinburgh, has recorded an interesting case of writer's palsy successfully treated by subcutaneous injections of strychnine, using equal parts of the liquor and water, injecting ♏ vj every second day, and gradually increasing the dose until ♏ xij was reached, the injections being made into the flexors and extensors of the fore-arm.

2. It is an excellent heart tonic.

3. Thorowgood praises strychnine and nux vomica most enthusiastically in paralytic and emphysematous asthma.

4. Strychnine, and more especially nux vomica, are excellent tonics, improving the appetite in a marked degree; but, in addition to this, nux vomica is of great service in various *dyspeptic*

conditions, relieving *h*
burn, *nausea*, and *flatu*
and being also a re
remedy in *sick headach*
the *vomiting of pregn*
It is an excellent additi
purgative pill masses, im
ing the tone of the mus
wall of the intestines ar
lieving constipation.

Dose, Mode of Administration, etc.

The dose of strychnine may be put at from $\frac{1}{30}$ to
(.002 to .005 Gm.), and the liquor [Br.] is a conve
form, in doses of from 5 to 10 minims, added to any
nary tonic mixture. We are usually advised to susper
administration from time to time, as it is stated that ur
fortable twitchings and rigidity about the jaw may sud
arise, giving evidence of the so-called "accumulatior
the drug.

By hypodermic injection we are usually taught tha
$\frac{1}{120}$ is the proper dose, and it is therefore difficult to u
stand why no poisonous results followed Barwell's som
heroic medication.

℞. Ferri sulph. exsic.	gr. xl ;	or	2	60 Gm.
Quininæ sulph.	gr. xl ;	"	2	60 "
Strychninæ sulph.	gr. ss ;	"		03 "
Mannæ	q. s.			

Fiant pilulæ xx. Sumat unam ter in die.

A useful tonic pill.

℞. Tinct. nucis vomicæ	f ʒj ;	or	4	Gm.
Acidi nitro-muriatici diluti	f ʒij ;	"	8	"
Spiritus chloroformi	f ʒj ;	"	4	"
Infusi gentianæ	ad f ℥vj ;	"	192	"

S. Dose, f ℥j ter die sumend.

For *flatulent colic*, taken after meals.

℞. Ferri sulph.,			
Ext. nucis vomicæ,	āā gr. ss ;	or	03 Gm.
Ext. aloes Barb.	gr. iij ;	"	20 "

Fiat pil. ante cibum sumend.

A good "dinner pill."

[Olea.

The officinal OILS are—

Oleum Adipis
" " Æthereum
" Amygdalæ Amaræ
" " Dulcis
" Anisi
" Aurantii Corticis
" " Florum
" Bergamii
" Cajuputi
" Cari
" Caryophylli
" Chenopodii
" Cinnamomi
" Copaibæ
" Coriandri
" Cubebæ
" Erigerontis
" Eucalypti
" Fœniculi
" Gaultheriæ
" Gossypii Seminis
" Hedeomæ
" Juniperi
" Lavandulæ
" " Florum
" Limonis

Oleum Lini
" Menthæ Piperitæ
" Menthæ Viridis
" Morrhuæ
" Myrciæ
" Myristicæ
" Olivæ
" Phosphoratum
" Picis Liquidæ
" Pimentæ
" Ricini
" Rosæ
" Rosmarini
" Rutæ
" Sabinæ
" Santali
" Sassafras
" Sesami
" Sinapis Volatile
" Succini
" Terebinthinæ
" Theobromæ
" Thymi
" Tiglii
" Valerianæ.]

[Oleata.

The officinal OLEATES are—

Oleatum Hydrargyri
Oleatum Veratrinæ

[Oleo-resinæ.

The officinal OLEO-RESINS are—

Oleo-resina Aspidii
" Capsici
" Cubebæ

Oleo resina Lupulini
" Piperis
Zingiberis.]

[OLEUM ÆTHEREUM—ETHEREAL OIL, U. S

A volatile liquid consisting of equal volumes of Heavy Oil of Win and of strong Æther.

Heavy oil of wine is a limpid, almost colorless, vola fluid, of a pungent taste and vinous odor. Its solution alcohol and ether is officinal as Spiritus Ætheris Composi (see page 140), but it is never prescribed alone.]

OLEUM MORRHUA—COD-LIVER OIL.

A fixed oil obtained from the fresh liver of Gadus morrhua, Linné, o other species of Gadus (Class Pisces, Ord. Teleostia, Fam. Gadid

LOCAL ACTIONS.

Cod-liver oil is not used in virtue of any local action, its nauseous smell effectually prevents it from forming basis of ointments or liniments. Being very readily absor by the skin, however, it is occasionally introduced into system by this channel when the patient is unable to tak by the mouth, and I have seen most excellent results p duced in strumous, rickety, and syphilitic infants in this w

CONSTITUTIONAL ACTIONS.

Physiological.	*Therapeutical.*
1. *Brain and Nervous System.*—Cod-liver oil can only be said to act on the nervous system by improving its nutrition and supplying the fatty ingredients necessary for growth and repair.	1. It is therefore speci indicated in all nervous af tions dependent on debil such as *neuralgia*, sc forms of *insanity*, *asth* *whooping-cough*, etc.
2. *Circulation.*—It has a tonic influence on the circulating organs, by improving the quality of the blood, and strengthening the heart muscles. It has been shown that it increases the number of red corpuscles of the blood.	2. It is therefore m used in *simple debility*, *convalescence* from acute ness, in *anæmia*, terti syphilis, and other weake conditions of the system.
3. *Respiration and Tem-*	3. Under this heading

perature.—No special physiological influence is exerted on either of these functions.

[MORRHUOL, which represents the active principles of the oil, minus the fat, is claimed to have special value as an alterative when the ordinary preparations are not well borne by the patient. It is given in smaller doses, as it represents twenty-five times its weight of cod-liver oil.]

4. *Digestive and Secreting Organs.*—It has been proved by experiment that animal are much more digestible than vegetable oils, probably on account of containing bile, and cod-liver oil is the most readily assimilated of all. After being emulsified by the pancreatic juice, it comes in contact with the bile, which distinctly increases its power of passing through moist animal membranes; and it is probable also that the biliary principles incorporated in its own structure aid in enabling it to be easily absorbed by the lacteals. Its action on the system now is to improve the general constitutional tone, to evolve force and heat, and to aid in supplying those fatty elements which are so essentially requisite for the

may place, for convenience, the wonderfully restorative effects of cod-liver oil in *chronic lung disease*, but more especially in the various forms of *pulmonary phthisis*. It is beneficial in *asthma* and *chronic bronchitis*, but in *consumption* it really seems to be directly curative. It may be given with advantage in all stages, and under its use patients often rapidly gain flesh, and not only manage to hold the disease at bay, but even occasionally seem to escape from its clutches.

4. Cod-liver oil is almost invaluable in diseases depending on defective nutrition, as in all scrofulous conditions, such as *strumous ophthalmia*, *caries of bones*, *chronic joint-affections*, *glandular enlargements*, etc.; also in *rickets* and all the wasting disorders of childhood, in senile atrophy and decay, in *chronic rheumatism*, in all the ulcerative varieties of *skin disease*, and in advanced *constitutional syphilis*. Various attempts have been made to explain the actions of the oil by means of certain special ingredients which it contains; but none of these have been successful, and we cannot at present do more than attribute its restorative influence to its ready digestibility and nutritive proper-

construction and repair of the tissues.

Cod-liver oil occasionally causes nausea, vomiting, and diarrhœa, and it has been shown to increase in some measure the biliary secretion.

ties, acting as it does a
hydrocarbon in nourish
the body. Possibly, howe
some therapeutic value r
be ascribed to minute qua
ties of iodine, bromine,
phosphoric acid, in its s
stance.

MODE OF ELIMINATION.

The greater part of the oil is absorbed into the system,
a little is given off by the feces; and it is well to watch
evacuations of children under its influence, to see whet
any undigested oil escapes, this indicating an overdose.

DRAWBACKS. MODE OF ADMINISTRATION.

Cod-liver oil occasionally produces so much nausea, eru
tion, and discomfort, as to compel us to suspend its adminis
tion; but most patients, and more especially children, spee
grow accustomed to its use. An eruption of acne sometim
caused by the passage of some of the acrid constituents of
oil through the cutaneous glands. It is advisable to presc
it in small doses directly, or, even better, an hour after me
or at bedtime, to give it with some light tonic, and to susp
it from time to time, more especially in hot weather, or w
bilious symptoms supervene. It may well be given in cor
nation with a little alcohol beaten up with the froth of por
with mucilage or lemon-juice floating on the top of a ta
spoonful of water in which a pinch of ordinary table salt
been dissolved, or with from ♏x to f℥j of æther puris, wh
Dr. B. Foster tells us, aids digestion by stimulating the
creatic secretion; but if the pale oil is used, very few per
will be found entirely rebellious to its use. Children,
rule, take it well, but if they prove obstinate we may
it with orange wine, or in the following combination:—

℞.	Olei morrhuæ	f℥ss;	or	16		Gm
	Mucilaginis acaciæ	f℥ij;	"	64		"
	Sacchari	ʒij;	"	8		"
	Tincturæ lavandulæ comp.	♏xx;	"	1	30	"
	Aquæ	f℥ss;	"	16		"

fʒs pro dosi.

[In private practice, Dr. Foster prefers to give it in the following mixture:—

℞.	Potassii bicarbonatis		ʒiss–ij;	or	6		Gm.	
	Acidi hydrocyan. dil.		♏xij–xvj;	"		75	"	
	Spiritus ætheris		ʒiss–ij;	"	6		"	
	Aquæ	q. s. ad	℥viij;	"	256		"	M.

Dose ℥j ter in die sumat.][1]

An agreeable oil cream and jelly has been made; we also may use it in biscuits or chocolate.

Black coffee forms a good medium for adults, or we may give the oil floating on beer, porter, or on the following mixture:—

℞.	Acidi nitrici diluti	♏x;	or		65	Gm.	
	Acidi hydrocyanici dilut.	♏j–ij;	"		06	"	
	Tincturæ aurantii	fʒss;	"	2		"	
	Aquæ	f℥ss;	"	16		"	M.

The dose should never exceed half an ounce.

[A pancreatic emulsion of cod-liver oil, and an emulsion with the lacto-phosphate of lime, or one with lime-water flavored with oil of bitter almonds, are largely used for children, although not officinal. Equal parts of extract of malt and cod-liver oil make a mixture that is readily taken by children.]

OLEUM MYRCIÆ—OIL OF MYRCIA (OIL OF BAY).

[*A volatile oil distilled from the leaves of Myrcia acris, De Candolle (N.O. Myrtaceæ).*

Spiritus Myrciæ (Bay rum). Oil of myrcia 16, oil of orange peel 1, oil of pimento 1, alcohol 1000, water 782 parts (to make 1800 parts). For external use.]

OLEUM OLIVÆ—OLIVE OIL.

[*A fixed oil expressed from the ripe fruit of Olea Europæa, Linné (N. O. Oleaceæ).*

Olive oil is nutritious and laxative, and is occasionally used for children as a substitute for castor oil. Dose, for an adult, f℥ij–iv (64. to 128. Gm.). It is a useful remedy for all kinds of irritant poisoning except PHOSPHORUS in stance. It is used largely in pharmacy.]

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[1] [Fothergill's Handbook of Treatment, Phila. 1878.]

Olive oil is only used externally as an emollient appl tion, and as the basis of various liniments. [It enters Emplastrum Plumbi and Unguentum Diachylon.]

OLEUM RICINI—CASTOR OIL.

[*A fixed oil expressed from the seed of Ricinus communis, Linné* (*N. O. Euphorbiaceæ*).

Enters into Collodium cum Cantharide and Collod Flexile.

Dose, ʒj–℥j (4. to 32. Gm.).]

EXTERNAL USES.

Castor oil is a substance of such bland and unstimula quality, that, were its smell less offensive, it might for valuable external agent in certain cases. It is, howe occasionally used as a soothing application to the eye w extreme temporary irritation has been set up by abrasio the corneal epithelium. Castor oil will purge when rul into the skin.

INTERNAL USES.

Physiological.

Castor oil gently stimulates the peristaltic movements of the intestinal canal, and slightly augments the fluid secretions of the gut. Some amount of astringent action generally follows the purgative action of the drug. Castor oil stimulates the intestinal glands, but not the liver. (Rutherford.)

The seeds are very irritating, and cause gastro-intestinal irritation, three having proved fatal to an adult.

Therapeutical.

Castor oil is a mild efficient cathartic, empt the intestines without cau griping or discomfort. therefore useful in all c where we simply wish to load the bowels; but it is a good habitual purga from the subsequent cons tion produced. This as gent action, however, giv a special advantage in treatment of *diarrhœa*, n cases of which depend the presence of irrita matters in the intes canal; and under such circumstances common sense naturally indicates the propriety of expelling the exciting cause. Dr. Geo. Johnson, however, goes further than this, and advocates the "eliminative" treatment of all diarrhœas, as well as of cholera.

Dose and Mode of Administration.

Although the best castor-oil has but little actual flavor, it leaves a greasy, sickly sensation on the palate, which is exceedingly unpleasant. It is therefore important to give it in some form of combination, and we find floating the dose in a glass of cinnamon water, between two strata of whiskey or brandy, to be an effectual plan, or we may make use of the following formulæ:—

℞.	Ol. ricini		f℥ss;	or	16	Gm.	
	Mucilaginis acaciæ,						
	Syrupi simplicis,	āā	f℥ij;	"	8	"	
	Aquæ cinnamomi	q. s. ad	f℥ij;	"	64	"	M.

Fiat haustus statim sumendus.

℞.	Ol. ricini		f℥iij;	or	12		Gm.	
	Tinct. opii		♏x;	"		65	"	
	Syrupi zingiberis		f℥j;	"	4		"	
	Aquæ menth. pip.	q. s. ad	f℥ij;	"	64		"	M.

Fiat haustus statim sumendus.

Either makes a good prescription for the diarrhœa of irritation.

[OLEUM SUCCINI—OIL OF AMBER.

A volatile oil obtained by the destructive distillation of amber, and purified by subsequent rectification.

Dose, gtt. v–xx (.30 to 1.30 Gm.).

The oil of amber is stimulant and antispasmodic, and has been administered in *bronchitis*, *hysteria*, and obstinate *hiccough*, and is also used externally, diluted with sweet oil, as a sedative and rubefacient for *whooping-cough*, or for *infan-*

tile convulsions, as in the mixture recommended by Dr. Parrish :—

℞. Olei succini rectificati,
Tincturæ opii, āā f℥ss ; or 16 | Gm.
Olei olivæ,
Spiritus vini Gallici, āā f℥ij ; " 64 | " M.

To be rubbed along the spine.]

OLEUM THEOBROMÆ—CACAO BUTTER.

[*A fixed oil expressed from the seed of Theobroma Cacao, Linn*
(*N. O. Sterculiaceæ*).

Oil of theobroma, being a firm, solid, and agreeable
stance, is much used in the manufacture of suppositories
entered into the following of the Pharmacopœia of 187

Suppositoria Acidi Carbolici	(each gr. j of carbolic acid).
" " Tannici	(" gr. v of tannic acid).
" Aloes	(" gr. v of purified aloes
" Asafœtidæ	(" gr. v of asafœtida).
" Belladonnæ	(" gr. ½ extract of bellado
" Morphiæ	(" gr. ½ sulphate of morp
" Opii	(" gr. j extract of opium
" Plumbi	(" gr. iij plumbi acetatis
" Plumbi et Opii	(" gr. iij plumbi acetatis gr. ½ extract. opii)

None of these are now officinal. Unless otherwise spec
suppositories are to be made with cacao butter, and
each weigh about 15 grains or 1 gramme when compl
Cacao butter is a good agent to apply to prevent crack
the nipples during nursing.]

[OLEUM THYMI—OIL OF THYME.

A volatile oil distilled from Thymus vulgaris, Linné (*N. O. Labia*

The oil of thyme is said to furnish the greater part of
commercial oil of origanum. It is aromatic and cou
irritant, the oil being used almost exclusively as a loca
plication, and as an ingredient in *opodeldoc*, the Linimen
Saponis Camphoratum of former editions of the Pharm
pœia.]

OLEUM TIGLII—CROTON OIL.

[*A fixed oil expressed from the seed of Croton Tiglium, Linné (N. O. Euphorbiaceæ).*

Dose, gtt. i–iv (.06 to .25 Gm.).]

LOCAL ACTION.

Physiological.

The topical application of croton oil to the skin causes a good deal of irritation, followed by the appearance of a copious crop of papules, gradually developing into pustules. Dr. Tilbury Fox has described a symmetrical erythema of the face following this local employment; and it is said that the addition of an alkali favors the development of the counter-irritant properties of the drug.

Its use in ringworm produces an artificial imitation of a variety of the disease called *kerion*, in which the patches become raised, swollen, red, and infiltrated (Alder Smith).

Therapeutical.

The local application of liniments containing croton oil was in former years a favorite mode of using counter-irritation in various chronic lung-affections, and it is still employed, more especially in public practice. But its drawbacks are, that it has a tendency to overact on tender or irritable skins, and the pustules are liable to leave cicatrices, so that it is difficult to believe it in any way superior to other and milder applications. Croton oil is an excellent application in ringworm, with the following precautions:—

Be careful of its use in children under 6 or 7 years of age.

Do not apply it at one time to a surface larger than a florin, and only to chronic cases, as it produces a good deal of inflammation, leaving an irritable and boggy condition of parts, which must be removed by poulticing. Repeat the painting next day, three or four applications being usually found sufficient.

INTERNAL ACTION.

When taken internally, croton oil produces much irritation of the intestines, running on, if the dose be sufficiently large, into a very fair imitation of the symptoms of cholera-poisoning, with vomiting, extreme purging, collapse, and acute inflammation of the intestines.

It is a hepatic stimulant of very feeble power. (Rutherford.)

Croton oil, then, is a d
tic purgative, valuable in
tain cases on account o
rapid and powerful ac
Thus, in *apoplexy* and o
cerebral affections, whe
is of importance to obtai
immediate and thorough e
uation of the bowels, an
some conditions of obsti
constipation, we find co
erable advantage from
cautious use.

MODE OF ADMINISTRATION, ETC.

Croton oil has an acrid and irritating flavor, and is
given in the form of pill. Garrod, however, tells us th
may well be prescribed in combination with castor oil,
in case the patient is unable to swallow, it may be place
the back of the tongue.

In an extreme case we might expect to obtain some
gative effect from rubbing it into the skin, as it appear
act by absorption through this channel. .

℞. Olei tiglii ♏ij; or | 12 Gm.
Micæ panis q. s.
Fiat pilula, statim sumenda, et horis duabus repet
si opus sit.

Or we may endeavor to keep its irritating propertie
check by prescribing it in the following combination:—

℞. Ol. tiglli ♏iij; or | 20 Gm.
Ext. colocynth. comp. gr. xx; " 1|30 "
Ext. belladonnæ alc. gr. iij; " |20 "
Misce, divide in pil. vj, quarum sumat unam si opus

For external use, a very good liniment is contained i
British Pharmacopœia.

OPIUM—OPIUM.

[*The milky exudation obtained in Asia Minor by incising the unripe capsules of Papaver somniferum, Linné (N. O. Papaveraceæ), (yielding not less than nine per cent. of morphine).*

Dose, gr. j–ij (.06–0.13 Gm.).

OFFICINAL PREPARATIONS, U. S.

Opii Pulvis (Powdered opium, containing not less than 12 nor more than 16 per cent. of morphine). Dose, gr. ss–i (.03 to .06 Gm.).

Opium Denarcotisatum (Denarcotized Opium should yield 14 per cent. of morphine). Dose, gr. ss–j (.03 to .06 Gm.).

Pilulæ Opii (gr. j). Dose, 1 to 2.

Extractum Opii (double strength of opium). Dose, gr. ss to j (.03–.06 Gm.).

Emplastrum Opii (extract 1 in 16).

Trochisci Glycyrrhizæ et Opii (gr. 1 of extract to 20).

Pulvis Ipecacuanhæ et Opii (Dover's Powder). (Ipecac and opium, āā 1, sugar of milk 8 parts). Dose, gr. x (.65 Gm.).

Tinctura Opii (Opium, gr. j in ♏xiij). Dose, ♏x–xx (0.65 to 1.30 Gm.).

Mistura Magnesii et Asafetida (Tr. opii 1 per cent.). (See MAGNESIA).

Tinctura Opii Camphorata (Paregoric Elixir, gr. j of opium in f℥ss) Dose, fʒj to ℥j (4. to 32. Gm.).

Tinctura Opii Deodorata (gr. j in ♏xiij). Dose, ♏x to xx (0.65–1.30 Gm.).

Tinctura Ipecacuanhæ et Opii (same strength as Dover's Powder). Dose, ♏v–x (.30 to .65 Gm.).

Acetum Opii (10 per cent.). Black drop. Dose, ♏v–xx (.30 to 1.30 Gm.).

Mistura Glycyrrhizæ Compositæ. (See GLYCYRRHIZÆ).

Trochisci Morphinæ et Ipecacuanhæ (each gr. $\frac{1}{40}$). Dose, 1 to 5.

Vinum Opii (10 per cent.). Dose, ♏viij (.50 Gm.).

Pulvis Morphinæ Compositus (Tully's Powder,

morph. sulph. gr. j, camphor, licorice, precip. carbon
calcium, āā gr. xx). Dose, gr. v–x (0.30 to 0.65 Gm

Codeina. Dose, gr. $\frac{1}{4}$ to $\frac{1}{2}$ (.01 to .03 Gm.).

Morphina
Morphinæ Acetas
Morphinæ Hydrochloras
Morphinæ Sulphas
Dose, gr. $\frac{1}{10}$–$\frac{1}{2}$ (.
.03 Gm.).]

POISONOUS ACTION.

When opium has been given in a poisonous dose t
sulting sleep gradually grows deeper, the breathing be
heavy and stertorous, the face flushed, swollen, and
the pupils contracted to mere points, distension of the
side of the heart still further prevents the return of
from the engorged lungs, and paralysis of the respi
centre finally causes death by suffocation. Much dif
may occasionally attend the diagnosis of opium-pois
from (1) alcoholic coma, where, however, the pupi
usually dilated; (2) from uræmic coma, where an exa
tion of the urine, if practicable, might clear up our d
and (3) from apoplectic effusion in the pons Varolii,
the symptoms are usually so similar as to render an ab
diagnosis, under certain circumstances, impossible.
death we find well-marked congestion of the brain.

TREATMENT AND ANTIDOTES.

When summoned to a case of opium-poisoning, th
indication must be to evacuate the stomach, and this i
effected by the stomach-pump, as the vomiting centre
much paralyzed by narcosis to allow of its effective sti
tion by emetics. We then try to counteract the tende
sleep by cold affusion, irritation of the skin, strong
galvanism, and walking the patient about, and, finall
may cautiously use atropine as the physiological ant
Although evidence comes to us from China of opium-p
ing checked by the antagonistic action of atropine, r
and opinions differ much on this head, and some autho
hold that atropine in certain proportions may even int
the action of morphine.

Professor Bennet believes that atropine may be of s
by contracting the vessels of the brain, and limitin
tendency to cerebral congestion.

As a last resource, we may have recourse to artificial respiration.

[Faradism is of great service in maintaining the action of the diaphragm and other respiratory muscles.]

Local Action.

Physiological.

It seems very doubtful whether opium can be absorbed through the unbroken cuticle. We are told that opium inspectors in India will remain for hours with their arms plunged up to the elbows in the inspissated extract, and that no narcotic effect is produced; but it is difficult, on the other hand, to believe that opium is entirely devoid of a property which belladonna possesses in so remarkable a degree. Sir Henry Thompson is also strongly of opinion that the bladder cannot absorb opium, but on this point more precise evidence is wanted.

Therapeutical.

Fomentations with the decoction of poppy-heads, and with other preparations of opium, have long been recognized as efficient means for the relief of pain in various inflammatory conditions, as hemorrhoids, erysipelas, conjunctivitis, etc.; but as we cannot bring forward evidence of absorption of the drug, we must merely attribute this soothing influence to the thorough application of moist heat. [It is stated by Ringer that opium in combination with poultices or liniments is absorbed through the integument.]

Internal Actions.

I. *On Nervous System.*—1. *Brain.*—In small quantity, or temporarily as the occasional preliminary action of a truly narcotic dose, opium is gently exciting to the brain, the intellectual faculties becoming generally stimulated, and the imagination more vivid. To this, however, rapidly succeeds a dulling or deadening effect, drowsiness supervenes, and

I.—1. Opium, being the most certain narcotic known, is very largely prescribed in a great variety of cases. In *simple insomnia*, in worn-out conditions of the nervous system, in *acute fevers*, such as *typhus* and *typhoid*, where delirium and sleeplessness constitute truly dangerous complications, in *delirium tremens*, in the later stages of severe *small-pox*, in me-deep sleep finally sets in, from which the patient wakes within a period of time proportioned to the quantity of the drug administered. Headache, dryness of the mouth, and digestive disturbance are frequently experienced, and idiosyncrasy may in some rare cases interfere materially with sleep by bringing into special prominence the exciting or stimulating properties of opium. It is not quite clear in what precise way the narcotizing influence is in this instance produced; but analogy would lead us to believe that contraction of the cerebral vessels imitates natural sleep by inducing an anæmic condition of the gray matter of the brain. This might appear to be contradicted by the deep cerebral congestion noted in the victims of opium poisoning; but Hammond has shown by experiment that whilst the brain is anæmic in sleep caused by a large dose, as the slumber passes into coma engorgement of the veins sets in. The resulting contraction of the pupil is probably central in origin, as it cannot be produced by any local application of opium in any form.

2. The conductivity and irritability of the sensory nerves are much diminished, so that pain is felt with less intensity.

ningitis, *acute mania*, and in numerous other diseased conditions which the reader can readily recall, this invaluable drug does most essential service by procuring sound and refreshing sleep. It would clearly be outside the scope of this little book to go into any exhaustive discussion on the varied uses of opium as a narcotic in disease, and we must refer our readers to the numerous and excellent works on the practice of medicine.

2. And even when not given in truly narcotic doses, it may also lull the sufferer into slumber by benumbing the sensory nerves and re-

3. The reflex function of the spinal cord is at first slightly increased, but subsequently becomes lessened in degree, and the respiratory centre is weakened and finally paralyzed. In cold-blooded animals, as the frog, in which the cerebral are subordinated to the spinal functions, opium causes most violent tetanic convulsions, and this has been observed in children.

4. The sympathetic system of nerves is also primarily

lieving pain. As a sedative, anodyne, or analgesic, it is indispensable in many painful conditions, such as *neuralgia, sciatica, cancer, biliary or renal calculi, labor after-pains, colic*, etc., and as we shall presently see, the subcutaneous injection of morphine is the most effectual, as it certainly is the most rapid and convenient, mode of obtaining this action of the drug.

Opium is also an excellent antispasmodic, and acts well by relieving irregular muscular contraction, as in the intestine causing *colic*, in the uterus tending to *abortion* or exhausting *after-pains*, in *spasmodic urethral stricture;* and its remarkable influence over certain forms of obstinate *ulceration* must also be due to some nervous influence.

3. Opium, having the property of arresting the muscular action of various organs, is our sheet-anchor in those terrible cases where *rupture of the intestine, bladder*, or *uterus* has occurred, and where the only possible chance of recovery consists in the most perfect rest of the viscus, encouraging the healthy process of repair, and preventing the escape of irritating secretions into the peritoneal cavity.

excited, and secondarily depressed.

II. *Vascular System.* — The action of the heart is at first slightly quickened, but afterwards its beats become slower, the pulse fuller and firmer, and the arterial tension is raised, this effect being considered due to an influence on the cardiac inhibitory nerves. It is noted, however, that shortly before death, in cases of opium poisoning, the pulse becomes feeble, rapid, and irregular. The stimulating action on the sympathetic nerves causes some contraction of the smaller vessels to accompany the use of moderate doses of opium.

III. *Respiration and Temperature.* — The breathing tends to become slow from the paralyzing influence of opium on the respiratory centre, and at the same time the secretion from the bronchial tubes is lessened.

The temperature at first rises a little, but finally falls when sweating is established.

IV. *Digestive and Secreting Organs.*—1. Nausea occasionally follows the use of opium, and constipation invariably results from diminu-

II. The subcutaneous injection of morphine has been advised by Dr. Clifford Allbutt, in *angina pectoris*, *palpitation*, and various painful cardiac conditions. Its contracting influence in the small vessels explains the antiphlogistic effect of opium in cases of *peritonitis* and other inflammatory conditions, as well as its power of checking *coryza* in its early stage. It also acts well as an astringent in some forms of hemorrhage, and more especially that from the lungs.

III. Opium is the most soothing remedy for coughs of all kinds, but more especially that of *phthisis*. It is a valuable aid in *spasmodic asthma* and the early stages of acute *pneumonia*, but in the later stages we must beware of its power of checking secretion, and in *bronchitis* it may do harm by slowing the respiratory movements, causing sleep to interfere with the due emptying of the bronchial tubes, and thus leading on to imperfect aëration of the blood and final suffocation.

IV. 1. Opium is an excellent astringent in *diarrhœa*, *dysentery*, and *British cholera*, often succeeding where other remedies fail, and for the tion of the intestinal secretions, no less than arrest of the peristaltic movement of the canal.

2. The salivary secretion is also diminished, causing dryness of the tongue.

3. The urine is lessened in quantity, but opinions differ as to the effect produced on its solid ingredients.

4. The biliary secretion is checked.

5. The secretion of the skin is increased, perspiration usually resulting, and we may say generally that opium checks all secretions but that of the skin.

Elimination takes place by the breath, sweat, urine, milk, etc.

relief of pain and tenesmus nothing is better than the enema of the Pharmacopœia (Br.). In the *diarrhœa* of ulcerative processes, such as *typhoid* and *phthisis*, and the later stages of *dysentery*, it is truly invaluable.

3. Opium is of great service in some cases of *diabetes*, checking the craving appetite, and lessening the secretion of sugar.

We must beware of its use, however, in advanced cases of *renal disease*, where it acts injuriously by checking secretion and encouraging the retention of urea in the blood.

5. Opium in some forms, and more especially Dover's powder, acts as an efficient diaphoretic, but, curiously, it has an opposite effect in *phthisis*, where it has been used with success to check night-sweats.

We must remember this elimination by the milk, in prescribing opium to suckling mothers.

CAUTIONS, AND MODES OF ADMINISTRATION.

In giving opium, we must remember that human beings, like the lower animals, are diversely susceptible to its influence. Thus ducks and pigeons can swallow large quantities with impunity, whilst the horse and the dog rapidly fall

under its influence; and although we can hardly lay
any general rules to guide us in practice, we shall find
some persons can take very heavy doses, whilst other
poisonously affected with unexpected rapidity. We
specially remember that children always bear opium b
one drop of laudanum having proved fatal to an infant
anæmic persons also are said by Traube to be readily
ceptible. To guard ourselves as far as possible from
we shall do well to begin with a moderate dose, an
variably to ask our patient whether he has ever tak
before.

As the system seems rapidly to accustom itself to th
of opium, we require gradually to increase the dose
so completely do persons habituate themselves to the
surable sensations derived that they willingly brav
resulting languor and digestive disturbance, and take
enormous quantities. De Quincey used to take as mu
320 grains daily, and from half a pint to a pint of laud
is by no means an uncommon daily allowance. Alth
the Turks, Chinese, and Hindoo races are the principa
tims of this habit, much opium is also consumed in this
in some parts of England, and moderate opium-eaters al
in all ranks of society. We must therefore be very ca
to warn our patients from time to time of the absorbin
ture of this practice, and of its enervating effects on
and body; and although it seems evident that good hea
not altogether incompatible with moderate opium-eating
that its use by smoking is far more deleterious, still th
abundant evidence of the general lowering tendency
habitual use of this drug as an act of mere self-indulg

As regards the various pharmaceutical preparatio
opium, when we wish to produce sleep we generally
scribe the tincture in a medium dose of ♏xx, the p
the extract (gr. j); whereas, if we merely wish to r
pain, smaller doses may prove sufficient.

The astringent action is best secured by small
which bring the stimulant properties of the drug into
and an incipient coryza may often be checked by 5
minims of laudanum taken at bed-time.

For diaphoretic purposes the combination with ipecacu
as in Dover's powder (pulvis ipecacuanhæ et opii, U.
of service; and for the relief of diarrhœa we also call t
aid the astringent properties of chalk and kino, as

pulvis cretæ aromaticus cum opio (Br.) (gr. xx to xl), and the pulvis kino compositus (Br.) (gr. xx); or the enema opii (Br.) may be soothing likewise in this condition, and allaying, by nervous sympathy, various painful conditions of the uterus and bladder.

As an adjunct to cough mixtures, and as forming their really effective ingredient, we most conveniently prescribe opium under the form either of the tinctura camphoræ composita (♏xx ad ʒj) or of the tinctura opii ammoniata (Br.) (♏xx ad ʒj), as in Prof. Christison's well-known formula:—

℞. Syrupi scillæ	℥ij;	
Aq. menth. pip.	℥ij;	
Tincturæ opii ammoniatæ	℥ss,	
Tincturæ lavandulæ compositæ	℥ss;	
Syrupi	℥j.	M.

Dose, ℥ss ter die.

In diabetes we must push the drug boldly, to the extent even of from 6 to 8 grains a day.

ALKALOIDS OF OPIUM.

The many-sided actions of opium which we have just described are due to its complex constitution and to the large number of alkaloids which it contains. Of these, morphine is by far the most generally used, and in the form either of the hydrochlorate or the acetate, but more especially of the former, it has in very considerable measure superseded the crude drug on which we were formerly obliged to depend. Its principal differences from opium are as follows:—

It is less astringent and antiphlogistic, and, by interfering less with secretion, its use is not attended by so much headache, constipation and dryness of tongue. It is more directly narcotic and anodyne, and is therefore a more convenient remedy when we wish merely to promote sleep or to relieve pain.

Its bulk is smaller than that of opium, and it is devoid of smell.

The action of the heart becomes slower, and the arterial tension is raised.

The respiration may become irregular from a depressing action on the vagi.

The functions of the spinal cord are stimulated, and hence we occasionally meet with restlessness and muscular twitch-

ings, which in some of the lower animals run on int
convulsions.

Irritability of the bladder is often observed, and tr
some itching of the skin, depending, in some cases, o
development of a minute papular or vesicular eru
Some years ago a favorite mode of using morphine w
what is known as the *endermic* method, in which the p
was sprinkled over the raw surface of a blister; but th
now been almost entirely superseded by the hypod
syringe. This ingenious little instrument enables us to i
a small quantity of morphine in solution beneath the
and the relief to suffering is usually immediate, and
times permanent. It matters little whether or no we intr
the remedy into the immediate neighborhood of the p
spot, our only caution being to avoid the vicinity of
bloodvessels or nerves, and to plunge the nozzle o
syringe fairly through the skin into the adjacent ce
substance. Some smarting usually follows the entran
the fluid, and inflammation and abscess may occasional
produced; but these accidents are rare, and the sting o
primary puncture may readily be obviated by benumbin
skin with ether spray. These injections are now
largely practised for the relief of pain, and more espe
in facial neuralgia, sciatica, lumbago, in the passa
biliary or renal calculi, in cancer, and a vast range of
cases in which acute suffering is the main symptom, w
enabled to give our patients temporary and sometimes
manent relief. So great, indeed, is the popularity of
mode of treatment, that a new school of opium-eating,
speak, has been formed, and morphine injections hav
fortunately been practised to a great extent as a mere d
opment of self-indulgence. We must, of course, be
careful not to give even the most casual or indirect encou
ment to such disastrous habits.

Some caution is always requisite in prescribing the
jections for the first time, as not only severe sickness
vomiting have followed their use in many cases, but
prostration, with failure of the heart's action, and even d
We must therefore carefully watch our patient for some
after the completion of the little operation. We must
begin with a larger quantity than the sixth of a grain;
we are told, on good authority, that the combination of
atropine to one part of morphine will effectually obvia

risk of these unpleasant consequences. For injection we may use the injectio morphinæ hypodermica, containing 1 gr. of the acetate in every 12 minims, remembering that morphine acts in this way three times more powerfully than when taken by the mouth. For internal use we may prescribe either salt in doses as from $\frac{1}{8}$ gr. to 1 gr., remembering, however, the varying susceptibilities of different persons, and the fact that so small a quantity as half a grain has caused death; or we shall find the liquor morphinæ hydrochloratis or acetatis (Br.) containing half a grain to the drachm, a convenient preparation. It is of the highest importance that all hypodermic solutions should be freshly prepared, as they very readily decompose, and thus cause irritation.

The B. P. has now added *morphinæ sulphas* and the *liquor morphinæ bimeconatis*, an excellent preparation, and often well borne by patients who cannot take morphine in other forms. Dose, 5 to 40 minims. The B. P. contains the injectio apomorphinæ hydrochloratis, composed of gr. ij ad aquæ camph. ℳ l.

Many of the other alkaloids contained in opium are merely subjects for physiological curiosity.

1. *Codeina* or *codeia*, however, is now frequently used, not for its narcotic properties, which are feeble and transient, but for an undoubted soothing influence which it exerts over various painful affections of the [stomach and] kidney. It is also an established remedy in diabetes, checking the secretion of sugar, and arresting, in some cases, the progress of the disease. Its great advantage over opium is, that it can be freely pushed without causing narcosis. We may give gr. $\frac{1}{4}$ to gr. ij thrice a day until drowsiness supervenes, or the sugar disappears, and from gr. x to gr. xv have been daily administered with benefit. [Fraser has shown, by a series of carefully conducted experiments, that codeine has no advantages over the hydrochlorate of morphine, in *diabetes*, in doses usually of one grain a day, and the latter is only about one-third of the price of the former.]

2. Narceine possesses only one-eighth of the narcotic properties of morphine, and is never used in medicine.

3. Crytopia is one-fourth as powerful as morphine, and, in addition to its hypnotic properties, it causes in the lower animals peculiar illusions of vision, with a tendency to convulsive action. It also is never used.

4. Thebaia is purely excitant, and in doses of 1 grai causes tetanic spasms.

5. Narcotina has no narcotic properties, but has s power as an antiperiodic.

6. Papaverine is narcotic.

7. Meconine is feebly narcotic.

Apomorphine, which is prepared from morphine, powerful emetic, occasionally used by subcutaneous inject in doses of $\frac{1}{16}$ gr.

[ORIGANUM—ORIGANUM (WILD MARJORU

Origanum vulgare, Linné (N. O. Labiatæ).

Officinal Preparation, U. S.

Vinum Aromaticum (see page 95).

The oil of origanum (not officinal) is an aromatic sti lant. Origanum in infusion has been used as a diaphor and emmenagogue, and externally as a fomentation.]

PAREIRA—PAREIRA (PAREIRA BRAVA).

[*The root of Chondodendron Tomentosum, Ruiz et Pavon (N. O. Menispermaceæ).*

Officinal Preparation, U. S.

Extractum Pareiræ Fluidum. Dose, f℥ss–j to 4. Gm.).]

Constitutional Actions.

Physiological.

Digestive and Secreting Organs. — Pareira acts in some measure as a diuretic, but its main influence is directed to the bladder, which it appears to stimulate and strengthen, improving the tone of its mucous lining, and lessening abnormal secretions.

Therapeutical.

Pareira is used in var *chronic bladder-affecti* but it seems to be very certain in its action.

[PEPO—PUMPKIN SEED.

The seed of Cucurbita Pepo, Linné (N. O. Cucurbitaceæ).

Pumpkin-seeds are an efficient tænicide in doses of one or two ounces. The decorticated seeds, beaten into a paste with sugar or milk, are given in the morning fasting, followed, in an hour or two, by a dose of castor oil.]

PEPSINUM SACCHARATUM—SACCHARATED PEPSIN.

[*Pepsin, the digestive principle of the juice obtained from the mucous membrane of the stomach of the Hog, and mixed with powdered sugar of milk.*]

Dose, gr. ij–xx (.12 to 1.30 Gm.).

[OFFICINAL PREPARATION, U. S.

Liquor Pepsini (Sac. pepsin 40 parts, hydrochloric acid 12 parts, glycerine 400 parts, water to make 1000 parts). Dose, ʒj–℥j (4 to 32 Gm.)].

INTERNAL ACTIONS.

Physiological.

Pepsin is the most important digestive element of the gastric juice, and more especially reduces the albuminoid and proteinaceous constituents of food to a fit state for absorption.

Probably, as suggested by Gubler, pepsin acts, partly at least, by directly stimulating the secreting function of the stomach mucous membrane.

The ordinary pepsin wines rapidly become inert, because the alcohol does not prevent the ferment from changing, glycerin being the most effective means of preservation. The acid glycerin is undoubtedly the best fluid

Therapeutical.

There can be little doubt that many dyspeptic conditions are due to a deficiency of gastric juice, and attempts may be made to supply this by prescribing pepsin, preferably in combination with dilute hydrochloric acid.

In *atonic dyspepsia*, in various *anæmic* and *cachectic conditions*, in the *diarrhœa of children*, in some forms of *spasmodic asthma*, its use seems to be attended with good results; but we may well share Dr. Wood's skepticism as to the possibility of materially aiding the digestion of food by the small doses usually prescribed.

Pepsin has also been re-preparation. [When given in combination with acids, the pepsin is much more active than in the form of powder. An artificial gastric juice thus made is of great service in weak digestion due to atony of the stomach. Strong solutions will digest blood clots and false membranes in cases of hemorrhage into the bladder, and in diphtheria.]

commended as an ad
to nutritious enemata,
to insure some prelin
digestion of the injected
and the peptonized
gruel, and beef-tea, pr
as recommended by Ro
of Manchester, with
pancreaticus, are very
given either by the mo
the rectum.

[PETROLATUM—PETROLATUM (PETROLE OINTMENT).

A semi-solid substance consisting of hydrocarbons, chiefly of the
gas series [$C_{16}H_{34}$, *etc.*] *obtained by distilling off the lighter and m*
atile portions from American petroleum, and purifying the residue.
ing point about 40° *to* 51° *C.* (104° *to* 125° *F.*), *the first constitu*
softer, and the second the firmer variety.

To a limited extent in the south of Europe, but in
quantity in the United States, petroleum is found eithe
ing from the ground or obtained by drilling wells.
oil, which is of a dark color of the consistence of mo
but decidedly fluorescent, yields, by rectification, a n
of hydro-carbonaceous compounds, some of which hav
ficient density to be used as ointments (cosmoline, va
etc.). On account of their property of resisting oxid
never becoming rancid in the hottest weather, ungu
petrolei, or petrolatum, is now being largely employe
substitute for lard as the basis of ointments. Coal o
been used externally as an ointment for painful *rheu*
joints and in the treatment of *scabies* with good results
combination of petrolatum with carbolic acid (5 per
on account of local anæsthetic effects of the latter, m
very useful embrocation for chilblains. Cosmoline is
cellent unirritating dressing for burns and scalds, or ex
tions and wounds, and is much used in hospitals. Inte
crude oil has been given in the case of tapeworm, also in w
ing-cough and bronchitis, but is rarely used by the m
profession. In excessive doses it produces oppression,
ness, palpitation, faintness, and headache, but no ten
to stupor, or even sleep. In one case frightful conv

appeared, in another death occurred with symptoms of gastro-enteritis on the twentieth day after it had been taken (Stillé). The urine, after taking the oil, has a peculiar odor, and it may have a special action upon the kidneys.

Rhigolene, one of the light products, has been used to produce cold with the hand-spray as a substitute for ether; in *chorea*, when it is applied along the spine, and as a local anæsthetic for some surgical operations. Its garlicky odor and explosiveness are the principal objections to its use.]

Vaseline is a soothing and agreeable application in skin diseases, but, wanting solidity, is best used in combination with white wax or other ointments.

Kaposi strongly recommends an ointment in eczema, made by dissolving and thoroughly incorporating by heat equal parts of vaseline and lead plaster, adding a little oil of bergamot.

[Petrolatum melts at the temperature of the body; it is odorless, and as it does not become rancid like ordinary fats, it is a good basis for ointments. It also may be obtained under the trade names of cosmoline, or vaseline cerate, fluid cosmoline, and in various combinations. It is an excellent dressing for burns. When Petrolatum is prescribed or ordered, without specifying its melting-point, the low melting variety, which liquefies at about 40° C. (104° F.), is to be dispensed.]

PHOSPHORUS—PHOSPHORUS.

[OFFICINAL PREPARATIONS, U. S.

Acidum Phosphoricum (see PHOSPHORIC ACID).

Oleum Phosphoratum (1 per cent.). Dose, ♏j–iij (.06 to 20 Gm.).

Pilulæ Phosphori (each $\frac{1}{100}$ grain).

Zinci Phosphidum. Dose, gr. $\frac{1}{24}$–$\frac{1}{12}$ (.002 to .005 Gm.).

Dose, in substance, gr. $\frac{1}{60}$ to $\frac{1}{12}$ (.001 to .005 Gm.).]

POISONING.

The poisonous effects consist of intestinal irritation and cardiac syncope, and death from exhaustion, the *post mortem* disclosing fatty, and parenchymatous, degeneration of liver, muscles and tissues generally. The blood becomes black, unduly liquid, and loaded with the products of tissue de position, such as uric acid, creatine, leucine, tyrosine, this resulting from the ozonizing properties of the po The degenerative changes are probably due to the form of fat from the albuminous constituents of the tissues t selves, by increased tissue change, or diminished oxida One and a half grains have proved fatal.

ANTIDOTES.

Sulphate of copper has been recommended as an anti and also turpentine, that is to say, the crude ozonized best given in the form of gelatine capsules, and promptl ministered, as it completely fails after twenty-four h about ʒij neutralizing each grain of phosphorus.

There is no direct antidote, but turpentine is said t as a prophylactic. [Old oil of turpentine is considere antidote to phosphorus, followed by demulcents and e ants. Large draughts of water containing magnes suspension are especially useful.] Sulphate of copper i best emetic to use.

CONSTITUTIONAL ACTIONS.

Physiological.

1. Its action on the *nervous system* is tonic and stimulant, repairing the waste of tissue. It is also useful, like arsenic, in certain obstinate forms of skin disease, as psoriasis, etc.

Broadbent explains its tonic action by a change which it effects in the blood through a gradual influence on all growths in all the organs and tissues, and more especially on cell growth in the skin as it passes through it.

Therapeutical.

1. Phosphorus is ther a valuable agent in *ne* debility, where the bra weakened by anxiety, w overwork, or sexual exc and where too great an of phosphates is excrete the urine; and in neur which has been show Anstie to depend on a f state of nerve tissue. considerable experience, ever, of the drug in conditions, I am strong opinion that no more rated remedy has ever introduced into practice, its action as a general to most uncertain, and th

2. On the *circulation* it acts in the first place as a stimulant; the pulse rises and gains in fulness but not firmness, the face flushes, and eventually signs of peripheric capillary expansion ensue, ending in free perspiration. In large doses, however, it depresses to a dangerous degree the heart's action.

3. The *temperature* during the administration of phosphorus at first rises slightly, next becomes secondarily lowered by three or four degrees in consequence of the dilatation of the superficial capillaries and resulting evaporation and radiation from the skin.

4. On the *urine* phosphorus exerts the following influence: Its quantity is increased, it becomes reddish, clouded with lithates, acquiring a violet smell, and, according to B. von Bauer, its proportion of urea is markedly increased.

Hæmaturia results from a poisonous dose.

5. On the *intestinal secretion* no effect is produced by small doses; but it has been held by good authorities that phosphorus may interfere with digestion by preventing the action of the gastric juice on albuminoid materials. In the

neuralgia it is greatly inferior to many other older and safer preparations.

2. Its depressing action on the heart is a serious drawback to its use, several fatal cases of cardiac syncope having been caused by moderate doses.

5. Much discussion has arisen respecting the remedial powers of phosphorus in leucocythæmia and in pernicious anæmia; the evidence in its favor being principally derived from one successful case, and from the undoubted fact

rapid, but the quantity of bone thrown out was far in excess of the usual amount.

Phosphorus is given out from the system principally by the urine, the drug being oxidized in the system and eliminated as phosphates.

CONTRA-INDICATIONS AND DISADVANTAGES.

We must generally feel our way in prescribing phosphorus, and begin with small doses, for some persons are more susceptible than others to its over-action. Sickness and diarrhœa occasionally follow its use, and Anstie records a case in which three or four $\frac{1}{30}$ gr. doses gave rise to long-continued epigastric pain. Nor must we forget its tendency to cause fatty degeneration of internal organs, this result being due to the formation of fat from their albuminous constituents by increased tissue-change and diminished oxidation. On the whole, we may sum up by saying that after ample trial phosphorus has entirely disappointed the hopes of those who argued from its physiological action to its therapeutical use, and that its drawbacks so largely counterbalance its advantages that it will probably soon disappear from ordinary practice.

MODE OF ADMINISTRATION AND DOSE.

Much of our success, however, in giving phosphorus depends on the mode in which it is prescribed, and, as a general rule, capsules containing $\frac{1}{30}$ grain are found to be a convenient medium. It also goes well with cod-liver oil, but it is very difficult indeed to devise any liquid formula by which it is prevented from becoming rapidly inert by oxidation. Most of the pill-masses are useless from being made with insoluble materials which pass through the bowels unchanged. But Mr. Carteighe has furnished me with the following formula for soluble pills:—

℞.	Phosphori	gr. j;	.06 Gm.
	Carbonis bisulph.	q. s.	
	Saponis		
	Pulv. glycyrrhizæ,		
	Pulv. guaiaci,	āā ʒss;	2
M.	Fiant pilulæ xxx.		

These pills should be varnished to prevent oxidation.

[Objections against the use of phosphorus in subs arise from its insolubility in the intestinal fluids, an danger of the local action in the stomach. The ethere lution or tincture of phosphorus may be given in combin with cod-liver oil, or, more acceptably, with the eli Calisaya bark; and phosphorized resin (4 per cent.) of convenient means of administration in pill form, one being equal to $\frac{1}{25}$ gr. of phosphorus.]

The dose, speaking generally, is from $\frac{1}{50}$ to $\frac{1}{30}$ grai we may give the phosphide of zinc, a very convenien reliable preparation, in pills containing from $\frac{1}{12}$ to $\frac{1}{4}$ [or, as recommended by Hammond, in combination nux vomica:—

℞. Zinci phosphid. gr. $\frac{1}{10}$;
Ext. nucis vom. gr. $\frac{1}{4}$.
M. ft. pil.

This is especially valuable in *neuralgia.*]

PHYSOSTIGMA—PHYSOSTIGMA (CALABA BEAN).

[*The seed of Physostigma venenosum, Balfour (N. O. Legumino Papilionaceæ).*

The ordeal bean of Old Calabar.

OFFICINAL PREPARATIONS, U. S.

Extractum Physostigmatis. Dose, gr. $\frac{1}{6}$ to $\frac{1}{3}$ to .02 Gm.).[1]

Tinctura Physostigmatis (10 per cent.). ♏xv–xl (1–2.60 Gm.).

Physostigminæ Salicylas.[2] Dose, gr. $\frac{1}{64}$ t (.001 to .015 Gm.).]

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[1] [Extract of physostigma has been given in much larger as much as four grains every hour having been administer tetanus, and even larger doses employed. Care should be t however, with these unusual amounts.]

[2] [According to Pohl and Harnack, physostigma contain active principles, *eserine*, opposed to strychnine, and *calabari* sembling strychnine, in its effects upon the spinal cord. E is now known as physostigmine.]

POISONOUS ACTION.

Calabar bean in small doses destroys life by paralyzing the respiratory centre and causing suffocation; but in larger doses it proves more speedily fatal by cardiac syncope.

ANTIDOTES.

In addition to the general principles of treating this form of poisonous action, we have here two physiological remedies at command—(1) atropine which directly antagonizes the respiratory depression; and possibly (2) strychnine which stimulates the cord.

LOCAL ACTIONS.

Physiological.

When applied to the surface of the body, Calabar bean exerts no special influence, but when introduced to the eye it causes very complete contraction of the pupil, the effect beginning in fifteen minutes, and lasting for about eight hours. This is attended by a little twitching of the lids, slight supra-orbital pain, dimness of vision, fall of intraocular tension, spasm of accommodation, and myopia. The pupil contraction is held to be due to stimulation of the fibres of the third nerve supplying the iris.

Therapeutical.

Calabar bean is therefore of use in ophthalmic surgery, to counteract the dilating effect of belladonna, and to prevent prolapse of the iris in cases of corneal injury or ulceration.

The most convenient way of using Calabar bean in ophthalmic surgery is by making a two-grain solution of sulphate of eserine [physostigmine], and putting a drop into the eye. This application is of service in strumous and phlyctenular ophthalmia and corneal ulceration, by limiting the access of light to the retina, and diminishing the reflex action, causing spasmodic contraction of the lids.

CONSTITUTIONAL ACTIONS.

I. *On Nervous System.*—1. The brain is quite unaffected, the mind remaining clear almost to the last in cases of poisoning.

2. The spinal cord, however, is especially attacked, and to a diminution of its motor power is due the muscular enfeeblement and final paralysis which affect those brought fully under the influence of this drug. A still more remarkable result, however, is the total abolition of all reflex activity, the most energetic stimulation failing to elicit the slightest response.

3. Although, in the first stage of Calabar bean action,

2. The depressing act
Calabar bean on the
powers of the spinal co
Fraser to propose it
remedy for *tetanus*, an
mode of treatment has p
very satisfactory in all
ing the symptoms and c
ing the course of this te
disease [and successful r
have been reported fro
employment].[1] It is of
importance that the
should be early used
vigorously pushed, as th
every reason to believe
the cord is free from m
pathological changes d
the first period of the di

Calabar bean has
tried without success in
rea, *epilepsy*, and other
vous disorders; but re
Dr. Crichton Browne
expressed his convi
founded on the obser
of a few cases, that i
prove useful in the g
paralysis of the insane.
it has been employed, w
leged success, in *loco*
ataxia and *writer's cra*

It has also been fou
act as an effective antid
strychnine-poisoning.

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[1] [Case of Dr. Layton in New Orleans Med. and Surg. J
for March, 1882, cured by sulphate of eserine; see also Pl
Med. Times, April 8, 1882, p. 475.]

the motor nerves are unaffected, a secondary lessening of their conductivity is noted, and, with reference to the sympathetic system, an early excitation is followed by secondary depression.

The contraction of the iris, noted above, which takes place equally on local or internal administration, is considered due to paralysis of the peripheral vaso-motor nerve-fibres, and to stimulation of the terminal filaments of the third nerve.

II. *Circulating Apparatus.*—Under small doses of Calabar bean, the heart's action becomes slower and stronger, and the arterial tension is notably increased; but when the system is brought more fully under the poisonous influence of the drug, the cardiac pulsations become feeble and irregular, and finally cease. These results are believed to be due to stimulation and subsequent exhaustion of the peripheral cardiac filaments of the vagi, and the primary contraction and subsequent relaxation of the arteries are explained in the same way.

III. *Respiration and Temperature.* — The breathing usually becomes slow and irregular, and the temperature falls a little.

A few drops of a solution of gr. 2 of sulphate of physostigmine, dropped into the eye every 15 minutes, have proved beneficial in *acute glaucoma.*

IV. *Secreting Organs.*—Calabar bean tends to cause vomiting, with violent and painful contraction of the stomach and increased peristaltic movement of the intestines.

Increase in the salivary and cutaneous secretion has also been observed.

IV. Calabar bean i hepatic stimulant, but o poisonous doses, so tha side of its action has no tical application. Atr antagonizes this, as al other actions of the dru

POISONOUS ACTION. CAUTIONS. MODE OF ADMINISTRATION.

Calabar bean in small doses destroys life by paral the respiratory centre and causing suffocation, bu larger quantity it proves more speedily fatal by ca syncope.

Caution is of course necessary in dealing with so po ous a substance as this. It is seldom used internall in tetanus the functions of the stomach are suspend great measure, and drugs are probably only very par absorbed. Subcutaneous injection is therefore our method, and we use a solution of the extract (from gr. or .01 to .02 Gm.), neutralizing its irritating acidi the addition of a little soda.

The alkaloid physostigmine or eserine is a conve preparation and may be used hypodermically. [The phate of physostigmine is ten times the strength of th tract, but is more liable to decomposition. The salic has been adopted as the officinal salt on account stability.

The following formula was used successfully in the c traumatic tetanus by Dr. Layton :—[1]

℞. Eserinæ sulphatis	gr. ½;	03 Gm
Glycerini	fʒij;	8 "
Syrup. aurantii corticis	fʒxiv;	56 "
Aquæ	f℥ij;	64 "

Dose, one drachm.

The glycerin was added to prevent changes in the es In the case referred to (9 years of age) a teaspoonfu given at first every hour, afterwards it was reduced a symptoms ameliorated. During seven days of treatment the boy took three grains (.20 Gm.) in all, without any toxic effects of the remedy being noticed other than its influence in controlling the disease.

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[1] [New Orleans Med. and Surg. Journ., March, 1882.]

The tincture of physostigma is recommended as a useful preparation of this remedy.]

[PHYTOLACCÆ BACCA—PHYTOLACCA BERRY (POKEBERRY).

The fruit of Phytolacca decandra, Linné (N. O. Phytolaccaceæ).

PHYTOLACCÆ RADIX—PHYTOLACCA ROOT.

The root of Phytolacca decandra, Linné (N. O. Phytolaccaceæ).

Phytolacca has been used as an alterative in ***syphilis, rheumatism, scrofula*** and ***chronic skin diseases.*** Although emetic and cathartic in doses of 15 to 30 grains (1–2 Gm.), it is not used for emptying the stomach or bowels, on account of the slowness of its action. The dose as an alterative is gr. j–v (.06 to 32 Gm.).]

PICROTOXINUM—PICROTOXIN.

A neutral principle prepared from the seeds of Anamirta paniculata, Colebrooke (N. O. Menispermaceæ).

Dose, gr. $\frac{1}{60}$ to $\frac{1}{20}$ (.001 to .003 Gm.).

The active principles of cocculus Indicus are (in the pericarp) menispermia, and paramenispermia, hypo-picrotoxic acid, resin, fat, and gum, and (in the seed) picrotoxin and anamirtin, or cocculin.

TREATMENT OF POISONING.

Empty the stomach, bowels and bladder, give stimulants, ammonia or ether by inhalation; and administer bromide of potassium.]

Physiological Effects.	*Therapeutical Effects.*
Cocculus indicus is poisonous to lower forms of animal and vegetable life. It is fraudulently added to malt liquors to stop fermentation, and increase the bitter taste.	A solution or ointment of cocculus indicus is used to destroy lice.
In man gastro-intestinal irritation, congestion of brain, strabismus, vomiting, collapse, and great depression of the functions of the spinal cord. Picrotoxin differs from strychnine in producing alternate clonic and tonic convulsions, but does not exalt the functions of the spinal cord as strychnine does. It is asserted that, in medicinal doses, picrotoxin acts like a bitter upon the stomach. Upon the spinal cord it acts like the combination of strychnine with belladonna. It also affects the cerebral functions, producing stupefaction and delirium; in dogs convulsions are produced.	It is applicable to states of the stomach characterized by depression, and in paralytic conditions of the bowel; and to certain cases of epilepsy, in which there is anæmia and feebleness. In paralysis it is less useful than strychnine. In chorea, in tremors of alcoholism, and similar nervous functional disorders, picrotoxin may be efficient. Murrell and Da Costa recommend it also in the treatment of night-sweats. As it has a special effect upon the alimentary tract, cocculus indicus may be used as a bitter tonic in cases of constipation due to torpor of the intestinal walls and in certain cases of indigestion.

[Pilulæ.

The officinal Pills are:

Pilulæ Aloës
" " et Asafœtidæ
" " et Ferri
" " et Mastiches
" " et Myrrhæ
" Antimonii Compositæ
" Asafœtidæ
" Catharticæ Compositæ
Pilulæ Ferri Compositæ
" Ferri Iodidi
" Galbani Compositæ
" Opii
" Phosphori
" Rhei
" Rhei Compositæ

Three Pill-masses are officinal: Massa Copaibæ, Massa Ferri Carbonatis, and Massa Hydrargyri.

[PIMENTA—PIMENTA (ALLSPICE).

The nearly ripe fruit of Eugenia Pimenta, De Candolle (N. O. Myrtaceæ).

OFFICINAL PREPARATION.

Oleum Pimentæ. Dose, gtt. iij–vj (.20 to .40 Gm.).

Pimento is a warm, aromatic stimulant, but is more used as a condiment than as a medicine. As a carminative, the dose is from 10 to 40 grains (.65 to 2.65 Gm.). It enters into Spiritus Myrciæ, and Spiritus Ammoniæ Aromaticus.]

PIPER—BLACK PEPPER.

[*The unripe fruit of Piper nigrum, Linné (N. O. Piperaceæ).*

PIPERINA—PIPERINE.

A proximate principle of feebly alkaloïdal power prepared from pepper and occurring also in other plants of the Nat. Ord. Piperaceæ.

Dose, gr. j–x (.065 to .65 Gm.).

OFFICINAL PREPARATION.

Oleo-resina Piperis. Dose, ℳj (.06 Gm.).]

Pepper is an acrid stimulant, acting more especially on mucous membranes, and hence, as a condiment, it is supposed to excite the secretion of the gastric juice. In former years it also acquired some reputation as a remedy for *hæmorrhoids*. [Piperin is sometimes added to antiperiodic pills, and it is certainly active, although it has been stated that it owes its effects to an impurity, the active oil of pepper.]

PILOCARPUS—PILOCARPUS (JABORANDI).

The leaflets of Pilocarpus Pennatifolius, Linné (N. O. Rutaceæ, Xanthoxyleæ).

Dose of the drug, gr. x to ʒj (.65 to 4. Gm.).

OFFICINAL PREPARATIONS.

Extractum Pilocarpi Fluidum. Dose, ♏ x–lx (.65 to 2.60 Gm.).

Pilocarpinæ Hydrochloras. Dose, gr. $\frac{1}{12}$ to $\frac{1}{3}$ (.050 to .02 Gm.).]

CONSTITUTIONAL ACTION.

Physiological.

Within ten or twelve minutes after jaborandi has been taken, the face flushes deeply, and profuse perspiration follows, accompanied by a great increase of salivary secretion, terminating in from two to four hours. The loss of fluid thus produced is very considerable, and the sweat has been proved to contain a large excess of urea. This action on the skin is considered due to vaso-motor paralysis and consequent dilatation of the cutaneous arterioles, and the sialagogue effects of the drug are attributed to stimulation of the periphery of the nerves supplied to the salivary glands. Jaborandi increases somewhat the action of the heart; and contraction of the pupil, with impaired accommodative power, has been noted to attend its use.

Therapeutical.

The powerful diaphoretic action of jaborandi, no less than its power in aiding the elimination of urea, would seem to suggest its use in various chronic *kidney-diseases* [Bright's disease], as well as febrile conditions. But its action is too short, sharp, and sudden, and too much depression and inconvenience are produced, to render us very hopeful of its ultimate success in practice. In *uræmia* pilocarpine may be given hypodermically.]

It has been prescribed in *diabetes insipidus*, and for the purpose of augmenting the secretion of milk.

Atropine and muscarine appear to be in many respects an exact physiological antidote to jaborandi.

[Mode of Administration and Dose.

The infusion of the powdered leaves is a good method of exhibiting the drug. A drachm should be steeped in half a pint of hot water, and when sufficiently cool stirred up and one-half the quantity drunk, half an hour later the remainder should be taken, without straining the infusion. This is generally sufficient to cause profuse sweating within an hour. Ptyalism is less constant in its occurrence. Experience, however, is in favor of using some of the pharmaceutical preparations in preference to the crude drug, as being more reliable and agreeable.

The fluid extract of jaborandi is now largely used, the full dose being a fluidrachm, representing a drachm of the leaves. An elixir is also made by some pharmacists, containing the virtues of one drachm in six fluidrachms.]

[The alkaloid of Jaborandi, possessing both the diaphoretic and sialagogue properties of the drug, is officinal under the name of

Pilocarpinæ Hydrochloras—Hydrochlorate of Pilocarpine ($C_{11}H_{16}N_2O_2HCl$; 244.4).

Constitutional Effects.

Physiological Effects.

Dr. Popow (*St. Petersb. Med. Woch.*, August 4), reporting upon the results derived from the hypodermic injection of pilocarpine in men in health and suffering from fever, and in experiments upon animals made in Prof. Suschtschinsky's laboratory, comes to the following conclusions :—

Therapeutic Uses.

From some comparative trials which he has made with the internal administration of pilocarpine, Dr. Curschmann believes that the infrequency with which it causes vomiting, as compared with jaborandi, is principally due to its being used hypodermically, and thereby avoiding direct irritation of the

1. Pilocarpine produces the same effect as an infusion of the leaves of jaborandi.

2. An injection of from gr. $\frac{1}{6}$ to $\frac{1}{3}$ (.01 to .02 Gm.) induces abundant sweating, without causing the unpleasant effects (giddiness, vomiting, cephalalgia) produced by jaborandi, and is, therefore, better suited for therapeutical employment.

3. The temperature diminishes without any prior exaltation, from one hour and a half to four hours, and reaches its minimum soon after the cessation of the sweating.

4. The increased excretion of saliva is observed alike in the healthy and the sick, after doses of from gr. $\frac{1}{6}$ to $\frac{1}{4}$ (.01 to .015 Gm.). Sweating only occurs in such doses in the healthy; fever patients, *e. g.*, typhus, requiring gr. $\frac{1}{3}$ (.02 Gm.).

5. The quickening of the heart's action produced by the pilocarpine continues a pretty long time after small doses, but when large ones are employed, this is soon replaced by retardation.

6. On the direct introduction of pilocarpine into the veins a retardation of the heart's action takes place suddenly without any prior acceleration.

7. Doses not exceeding gr. $\frac{1}{2}$ (.03 Gm.) do not exert stomach. Some persons, especially those who have been weakened by prior disease, complain of a sense of debility, but this usually soon passes off; but in others a complete state of collapse is produced, which may or may not be connected with prior vomiting. The possibility of this occurrence must always be borne in mind. It is dependent upon the amount of the dose and the susceptibility of the individual. It is oftenest met with in women, and in those whose strength has been greatly reduced; and when the patient's constitution is not known, the first dose of the medicine should not exceed gr. $\frac{1}{3}$ (.02 Gm.), while its effect should be watched for a quarter or half an hour. As far as the trials have gone, pilocarpine does not seem to act dangerously on the subjects of heart-disease, and, indeed, can be employed when no other diaphoretic procedure, for so long a period, would be ventured upon. Indeed, as a therapeutical agent for the production of diaphoresis, it is superior to any other method in use, being more easily employed, while its action is more certain and more complete, without being more or even as dangerous as most of them. Its superiority over the various

any particular effect on the alimentary canal; but large doses, gr. $\frac{5}{6}$ to gr. jss (.05 to .10 Gm.), induce purging, or even bloody stools, with intestinal movements and the development of gases.

The quantity of urine and the amount of urea are both increased during the twenty-four hours succeeding its administration.[1]

It is uncertain whether jaborandi exercises any direct effect upon the heart.

sweating-baths in *ascites*, *hydrothorax*, *asthma*, etc., is most marked. It is true that diaphoretic treatment is thought less of than formerly; but in several cases the difficulty of its application, rather than its inefficiency, is the cause of its not being resorted to. Speaking from his own experience, Dr. Curschmann has found the pilocarpin very useful in *œdema*, in *dropsy* of the cavities from heart or lung disease, and in *chronic nephritis*, etc., and that after diuretic, drastic, and other means have failed. He believes that a large field for its employment may be found in *pleurisy* accompanied by serious exudations, both in promoting the absorption of this, and in preventing its re-accumulation after paracentesis. It is evidently indicated in *chronic rheumatic affections*, at least so far as these are amenable to diaphoretic treatment, and in some chronic skin affections, its use has been attended with considerable success.

Da Costa has shown that in *acute erysipelas* pilocarpine, or the fluid extract of jaborandi, exerts remarkable influence in cutting short the inflammation. Prof. Demme[2] gives, in dropsical affections of children, doses of gr. $\frac{1}{12}$ to $\frac{1}{3}$ (.005 to .02 Gm.) of pilocarpine, which he regards as an efficacious diaphoretic and sialagogue in the treatment of certain diseases of children, and in appropriate doses it is well b by the youngest patients. Unpleasant symptoms are of rare occurrence, and can probably be altogether preve by administering small doses of brandy before the injecti

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[1] [Drs. Tyson and Bruen, Am. Journ. Med. Sciences for July 1, 1887.]

[2] [Med. Exam., July, 1878.]

The cases for which pilocarpine is especially suitable the parenchymatous inflammations of the kidneys dropsy, following scarlatina and diphtheria. In the majo of cases the flow of urine is decidedly increased, while quantity of blood and albumen in the urine is diminis rather than augmented.]

PIX BURGUNDICA—BURGUNDY PITCH.

[*The prepared resinous exudation of Abies excelsa, De Cando* (*N. O. Coniferæ*).

OFFICINAL PREPARATIONS.

Emplastrum Picis Burgundicæ.
Emplastrum Picis cum Cantharide.

Enters into Emplastrum Ferri, Emp. Galbani, Emp trum Opii.]

Pitch is used externally in the form of plaster.

[PIX CANADENSIS—CANADA PITCH (HEM LOCK PITCH).

The prepared resinous exudation of Abies Canadensis, Michaux (*N. O. Coniferæ*).

OFFICINAL PREPARATION.

Emplastrum Picis Canadensis.

Used only in the form of the plaster. The oil of Abies, or Pinus Canadensis, or Hemlock Spruce (oi spruce, oil of hemlock), has been given to produce abort A fluid extract of the bark (Ext. Pinus Canadensis flui not officinal, is largely used as an astringent for gargles, ginal douches, etc.]

PIX LIQUIDA—TAR.

[*An empyreumatic oleoresin obtained by the destructive distillation of the wood of Pinus palustris, Miller, and of other species of Pinus (N. O. Coniferæ).*

OFFICINAL PREPARATIONS, U. S.

Syrupus Picis Liquidæ (6 per cent.). Dose, f℥j–iv (4. to 16. Gm.).

Unguentum Picis Liquidæ (Tar and suet, each 50 parts).]

EXTERNAL ACTIONS.

Physiological.

Tar acts as a stimulant to the skin, and is apt to produce an irritable papular eruption. It is rapidly absorbed, and if allowed to remain in contact with the surface of the body, or if applied over an extensive cutaneous area, feverish symptoms ensue, with an abundant discharge of blackish urine, smelling strongly of tar.

Therapeutical.

Tar is an excellent application in cases of chronic scaly skin diseases, as *psoriasis.*

To lessen the risk of exciting an undue amount of irritation, it is well to wash the skin perfectly clean before renewing the application, and it is important to rub in the ointment thoroughly until it nearly disappears.

INTERNAL ACTIONS.

Tar seems to have a stimulating action on mucous membranes when taken internally. [Tar contains a certain proportion of creasote, upon which some of its therapeutic effects depend.]

The vapor of tar used to be a remedy of some reputation in *chronic bronchitis,* and recently Prof. Ringer has recommended two-grain pills, three times a day, as a most efficient remedy in *winter-cough.* The internal use of tar has also been praised by Dr. McCall Anderson in chronic skin diseases. [The syrup of tar is now officinal;

it may be given in adv
bronchitis, in half-
doses.]

℞. Picis liquidæ ʒij
Alcoholis ʒiij
Cola, et adde
Aq. ammon. fortioris ♏vj
Glycerini ʒvj
Aq. destillatæ ℥xij

A good applicatio
chronic eczema. (Ander

PLUMBUM—LEAD.

[OFFICINAL PREPARATIONS, U. S.

Plumbi Oxidum (Litharge). Used in making
Emplastrum Plumbi (Diachylon plaster), which e
into Emplastrum Asafœtidæ, Emplastrum Ferri,
plastrum Galbani, Emplastrum Hydrargyri, Em
trum Opii, Emplastrum Resinæ, Emplastrum Ar
Emplastrum Belladonnæ, Emplastrum Saponis.

Unguentum Diachylon (Lead plaster 60, oliv
39, ol. lavender 1).

Liquor Plumbi Subacetatis (Goulard's extr
(about 25 per cent. of subacetate of lead).

- Liq. Plumbi Subacetatis Dilutus (lead water), (3 per
of preceding).
- Ceratum Plumbi Subacetatis (Goulard's cerate), (2
80 of camphor cerate).
- Linimentum Plumbi Subacetatis (40 to 60 cotton-
oil).

Plumbi Acetas (Sugar of lead). Dose, gr. i–v
to .30 Gm.).

Plumbi Carbonas.

- Unguentum Plumbi Carbonatis (10 per cent.).

Plumbi Nitras (used as a disinfectant—Ledoyen'
lution). Dose, internally gr. $\frac{1}{4}$ to $\frac{1}{2}$ (.015 to
Gm.).

Plumbi Iodidum. Dose, gr. $\frac{1}{12}$ to $\frac{1}{4}$ (.005 to
Gm.).

- Unguentum Plumbi Iodidi (10 per cent.).]

POISONOUS EFFECTS.

The first sign of chronic lead-poisoning is a bluish line running along the free margin of the gums [especially around the incisor teeth, upper and lower], composed of minute dots, and depending on the actual deposition of lead in the mucous membrane. To this succeed colic, wrist-drop, and the other symptoms mentioned below, the *post mortem* disclosing chronic catarrh of the stomach and intestines, with the deposition of the metal in the bones, liver, kidney, brain, nervous and muscular fibres.

Chronic lead-poisoning has occasionally resulted from adulterated cider or from water, and indeed in a variety of ways, but it is most common in painters, who are brought much in contact with the carbonate in the practice of their business.

ANTIDOTES AND TREATMENT.

[Sulphuric acid forms an insoluble compound with lead, and, therefore, the soluble sulphates (alum, Epsom salts) are chemical antidotes to lead poisoning; they often are given combined with sulphate of morphine to relieve pain and relax spasm.]

In poisoning by lead, we must give sulphate of magnesium, iodide of potassium, sulphur baths, and remove its after-effects by galvanism of the paralyzed muscles; but it is stated that sulphuric-acid lemonade, and a liberal indulgence in fatty articles of diet, may act in some degree as prophylactics. Common salt is said to be a good antidote because lead is eliminated from the kidneys as a chloride.

LOCAL ACTIONS.

Physiological.

The external action of lead is partly sedative and partly astringent. [All the preparations of lead are used externally, but the acetate appears to be the one best adapted for internal use.]

Squire praises a glycerate

Therapeutical.

Lead, in the form of subacetate, is much used as lotion for *erysipelas*, *acute eczema*, and various ulcerative conditions.

It forms a good collyrium in the more superficial inflammations of the eye; but we of the subacetate of lead very highly in eczema.

must remember that its tendency to deposition may cause a permanent white patch in corneal ulcers.

The powder of nitrate of lead has been shown to be a good application in *onychia maligna.*

[An improved process for making Hebra's diachylon ointment for *skin diseases* is given by Deringer (New Remedies, 1880) as follows: Dissolve 200 Gm. of acetate of lead in one litre of distilled water, and 300 Gm. of white Castile soap in 1½ litre of warm distilled water. Filter both solutions and mix them. The precipitate is washed with water, then freed as much as possible from moisture by kneading, and one part of it is melted with 1½ parts of best olive oil, on the warm bath. The mixture is then triturated in a mortar until it forms a fine white salve.—(Proc. Am. Pharm. Assoc., 1881, p. 63.)]

INTERNAL ACTION AND USES.

1. *Brain and Nervous System.*—When lead is given in poisonous doses, a curious train of nervous symptoms show themselves, beginning with violent neuralgic pains and giddiness, and running on into delirium, with epileptiform convulsions, and subsequent melancholia. Sclerosis of the areolar tissue, with diminution of the nervous elements, has been found in certain of the sympathetic ganglia, but more especially the cœliac and cervical ganglia. Atrophy of the optic nerve is an occasional, though rare, complication of lead-poisoning.

2. *Heart and Circulation.*—During the action of lead, the heart becomes slow and the pulse smaller and harder, indicating a condition of contraction and tension of the arterial system; and this is by some supposed to be due to a primary effect on the sympathetic, whilst others hold that lead has a direct influence over unstriped muscular fibre, and most powerfully over that which encircles the arteries. Lead tends to produce pallor by destroying the red blood-corpuscles.

3. *Intestinal Tract.*— A prominent symptom of chronic lead-poisoning is obstinate constipation depending probably on contraction of the small intestine, and associated with violent colicky pain around the umbilicus. The appetite at the same time becomes bad, the tongue loaded, and nausea and even vomiting are observed. Gastro-enteritis is generally one of the symptoms of acute poisoning.

4. *Urinary System.*—Lead has the curious property of obstructing the elimination of uric acid from the blood through the kidneys, and may thus cause gout in painters and others who are exposed to the effects of the metal.

5. *Muscular.*—Lead causes violent pains in the muscles, with a peculiar form of para-

2. This contractile influence of lead over the smaller vessels explains its action in *internal hemorrhage*, as we know that *hæmoptysis*, more especially, may be very successfully treated by acetate of lead in doses of from ½ gr. to 3 grs. (.03 to .20 Gm.).

3. Acetate of lead is an excellent astringent in *diarrhœa*, more especially that of phthisis, and British [or *sporadic*] *cholera*.

Dr. Thorowgood has obtained good results from lead in obstinate *obstruction of the bowels*.

lysis affecting the extensors of the forearms, and causing the well-known wrist-drop; and *post mortem* we find fatty degeneration of the muscular structures.

The contracting power of lead over unstriped muscular fibre probably explains the tendency to abortion noted during its poisonous influence.

MODE OF ELIMINATION.

Lead is thrown out of the system by the urine, bowels, and lacteal glands.

MODE OF ADMINISTRATION, ETC.

If we wish to administer lead internally, we gene prescribe either the acetate or pil. plumbi cum opii [(1 gr. of opium in 8), dose, 4 to 8 grs. (.25 to .50 Gm.

Externally we find the liquor plumbi subacetatis di the most convenient form, but the glycerole and oleate also good preparations, and the British Pharmacopœia lately added the glycerinum plumbi subacetatis to the li

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PODOPHYLLUM—PODOPHYLLUM (MAY APPLE).

[*The rhizome of and rootlets of Podophyllum peltatum* (*N. O. Berberidaceæ*).

OFFICINAL PREPARATIONS, U. S.

Abstractum Podophylli. Dose, gr. v–x (.3 0.65 Gm.).

Extractum Podophylli. Dose, gr. v–x (.30 to Gm.).

Extractum Podophylli Fluidum. Dose, ♏ v (.30 to 1.30 Gm.).

Resina Podophylli (sometimes incorrectly called *dophyllin*). Dose, gr. $\frac{1}{8}$–$\frac{1}{4}$ (.007 to .015 Gm.).]

LOCAL ACTION.

Podophyllum cannot penetrate the unbroken cuticle, but experiment has shown that it exerts its purgative influence when applied to a raw surface.

CONSTITUTIONAL ACTIONS.

Physiological.

The only marked physiological property of this drug is that of irritating the duodenum and causing a profuse flow of watery evacuations, largely mixed with bile. Some controversy has taken place as to whether podophyllum can be called a cholagogue in virtue of any direct stimulation of the secreting structures of the liver, experimental evidence seeming to show that it probably acted by contracting the gall-bladder, and thus favoring the expulsion of its contents, and by exciting the duodenum to sweep away the bile effused into it by the hepatic ducts. The more recent experiments of Rutherford and Vignal, however, have reinstated podophyllum in its old position as a true stimulant of the biliary secretion, the mistake made by Bennett, who denied its cholagogue action, having arisen from the administration of too large doses, and the consequent antagonism of the intestinal irritation to the hepatic secretion (*vide* PURGATIVES).

Therapeutical.

Podophyllum is a valuable remedy in *jaundice* and in the various forms of *functional liver affection.* It may be used in simple *chronic constipation*, in the constipation of children attended with the painful and difficult evacuation of hard, dry feces, and in the opposite condition of *diarrhœa* with pale and frothy motions.

In sick headache it also acts well.

[Podophyllum is an efficient substitute for jalap, and may be used for all purposes for which the latter drug has been recommended.]

Cautions and Mode of Administration.

We must remember that podophyllum is an uncertair acting well in some cases, very slightly in others, whil third class it causes much discomfort and griping. It visable, therefore, always to begin with small doses, as or ½ gr., and to prescribe it in the form of a pill, com with other ingredients which may restrain its irri action. Thus:—

℞.	Resinæ podophylli	gr. ij;	or		12 Gm
	Extracti belladonnæ alc.	gr. iij;	"		20 "
	Pil. colocynthidis compositæ	gr. xxxvi;	"	2	30 "

Fiant pilulæ duodecim, quarum capiat unam omni nocte

Ringer recommends a very convenient way of presci podophyllum [resin] for children, by dissolving a grai drachm of rectified spirit, and giving five or six drops or four times a day, on a lump of sugar, or painted on a

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POTASSIUM.

[Officinal Preparations, U. S.

Potassa. Caustic Potassa.
  Liquor Potassæ. Dose, ♏x–xxx (.65 to 2. Gm.).
  Potassa cum Calce (equal parts) used as a caustic.
Potassii Acetas. Dose, gr. xx–ʒj (1.30 to 4. Gm.
Potassii Bichromas (as an alterative). Dose,
  (.01 Gm.). Rarely administered internally.
  (Used in preparing Sodii Valerianas.)
Potassii Bitartras (Cream of Tartar). Dose,
  (4. to 16. Gm.).
  Antimonii et Potassii Tartras, Ferri et Potassii Tar Potassii et Sodii Tartras (Rochelle Salt), Potassii tras, Pulvis Jalapæ Compositus.
Potassii Bromidum. Dose, gr. xx–ʒj (1.30 to 4 G
Potassii Carbonas. Dose, gr. x–xxx (.65 to 2. G
  (Extractum Mistura Ferri Composita, Potassii Bi bonas, Potassa Sulphurata, and in making Chl formum Purificatum and Spiritus Ætheris Nit Unguentum Sulphuris Alkalinum; also in mal Potassii Bromidum and Cyanidum, and Mistura Po sii Citratis.)

Potassii Bicarbonas. Dose, gr. x–ʒj (.65 to 4. Gm.).
(Liquor Magnesii Citratis, Liquor Potassæ, Liquor Potassii Arsenitis, Liquor Potassii Citratis, Mistura Potassii Citratis, Potassii Acetas, Potassii Citras.)
Potassii Chloras. Dose, gr. v–xx (.30 to 1.30 Gm.).
Trochisci Potassii Chloratis (āā gr. v).
Potassii Citras. Dose, gr. x–xxx (.65 to 2. Gm.).
Liquor Potassii Citras. Dose, f℥ss (16. Gm.).
Potassii Cyanidum. Dose, gr. $\frac{1}{10}$ to $\frac{1}{12}$ (.005 Gm.).
Potassii Ferrocyanidum. Dose, gr. x–xv (.65 to 1. Gm.).
(Used in making Acidum Hydrocyanicum Dilutum, Argenti Cyanidum, Ferri Ferrocyanidum, Hydrargyri Cyanidum, and Potassii Cyanidum.)
Potassii Hypophosphis. Dose, gr. x–xxx (.65 to 2. Gm.).
Syrupus Hypophosphitum. (See PHOSPHORUS.)
Potassii Iodidum. Dose, gr. x–ʒj (.65 to 4. Gm.).
(Ammonii Iodidum, Hydrargyri Iodidum Rubrum, Liquor Iodi Compositus, Plumbi Iodidum, Unguentum Iodi, Unguentum Potassii Iodidi (ʒj to ℥j).)
Potassii Nitras. Dose, gr. x–xv (.65 to 1. Gm.).
Argenti Nitras Dilutus.
Charta Potassii Nitratis.
Potassii Permanganas. Dose, gr. j–v (.06 to .30 Gm.).
Potassii Sulphas. Dose, gr. xx–ʒiv (1.30 to 16. Gm.).
Potassii Sulphis. Dose, gr. xv–ʒj (1. to 4. Gm.).
Potassii et Sodii Tartras (Rochelle Salt). Dose, ℥ss–j (16. to 32. Gm.).
(Pulvis Effervescens Compositus. See page 133.)
Potassii Tartras. Dose, ʒj–℥j (4. to 32. Gm.).
Potassa Sulphurata. Dose, gr. ij–v (.12 to .30 Gm.).

POISONING.

Caustic potassa is a corrosive mineral poison. The symptoms produced by it are an acrid, caustic, urinous taste in the mouth, a sensation of burning heat in the throat, nausea, and sometimes vomiting of bloody matters. The surface becomes cold and clammy; the pulse quick and feeble; and there is often hypercatharsis, and violent colicky pains.

Morbid Appearances.—Strong marks of inflammation in the alimentary canal, with softening, erosion of the mucous

coat, and, in some cases, perforation of the stomach.
may ensue partly from depression of the heart, and
from inflammation of stomach and intestines.

TESTS.

The alkaline reaction. It precipitates silver nitrate
form of a dark-colored oxide. Carbonic acid water
no precipitate. A concentrated solution, acidulated
muriatic acid, affords a deep-yellow precipitate with pla
bichloride. A solution of tartaric acid causes a white
pitate of cream of tartar.

ANTIDOTES.

Vinegar and the diluted vegetable acids; to be fol
by a free use of demulcents, or oleaginous mixtures.]

LOCAL ACTION.

Physiological.

Caustic potash is a most powerful escharotic, withdrawing water from the tissues, and thus destroying them. It has, however, the disadvantages of being very deliquescent, and this tendency to spread, beyond the part we wish to attack, has led to its practical abandonment as a local application.

The solution of permanganate of potash (Condy's fluid) oxidizes and destroys many organic substances.

Therapeutical.

Caustic potash, eith
sticks or combined with
in the form of potassa
calce, was formerly us
the treatment of va
forms of ulceration, an
the production of i
which barbarous relic
antiquity are now fortu
ly discarded from pra
Liquor potassæ has bee
commended to soften
great toe-nail and faci
its removal when ingrow
and the bicarbonate of p
forms a good lotion in
eczema, as an injectio
leucorrhœa, and as an a
cation to *rheumatic join*

It is therefore antise
and a good application t
healthy ulceration. [La
recommends the subcutan

injection of a strong solution in *snake-bite*, about ♏xv being thrown into each puncture made by the fangs of the serpent.]

INTERNAL ACTIONS AND USES.

Physiological.

1. *Brain and Nervous System.*—Potassium salts, and more especially the nitrate, when given in large doses, exert a paralyzing action on the spinal cord, producing great muscular weakness and finally abolition of reflex sensibility.

2. *Heart and Circulation.*—Moderate doses of the nitrate raise the arterial tension and slow the heart's action, and if the drug is further pushed, the pulsations become weaker, still slower, and finally irregular, before the total arrest of movement supervenes. Coagulation of the fibrine is prevented, and the red corpuscles are restrained in their functions of oxygenation. Chlorate of potassium in large doses (gr. cl. in 24 hours) causes vomiting, hæmatemesis, delirium, icterus, and coma, the urine being of a chocolate color, and full of disintegrated blood-corpuscles.

Potassium salts cause the blood, and secondarily the urine, to become alkaline, and any excess of uric acid may

Therapeutical.

2. This has been supposed to explain the beneficial action of potash in *acute rheumatism*, which is held to depend on an excess of uric [lactic?] acid. Much controversy has taken place with reference to the alkaline treatment of this disease, but I am decidedly of opinion that if large doses of bicarbonate of potassium do not shorten its duration, they relieve symptoms, and lessen the tendency to cardiac complications. Potash acts well also in *gout* and *chronic rheumatism* by forming a soluble salt with uric acid.

thus become neutralized. These salts are of great importance for the nutrition of the muscles and the blood-corpuscles.

3. *Intestinal Tract.*—Chlorate of potassium moderates excessive action of the salivary glands, and assists the healing of ulceration about the gums, mouth, and throat. The salts of potash generally neutralize free acid in the stomach and intestines, and the nitrate in full doses may cause death by gastro-enteritis. Most of the potash salts are slightly purgative, but only the acid tartrate has any very decided action of this kind, causing as it does the abstraction of a large quantity of watery fluid, without, however, stimulating the peristaltic movement of the intestines. The sulphate is also aperient in its action.

4. *On Secreting Organs.*—It will be remembered that, in speaking of acids, we referred to a law which has been more especially developed by Ringer, and which explains their power of checking acid secretions. Alkalies have precisely the opposite effect, arresting the activity of glands furnishing alkaline fluids, whilst they directly stimulate those whose secretion partakes of the opposite character.

Scurvy is held by some to be dependent on a deficiency of potassium salts in the blood.

3. Chlorate of potassium, in doses of from 5 to 20 grains, is an admirable remedy in ***mercurial salivation***, in various aphthous conditions, and in sore throat, whether produced by [*diphtheritic croup*], *scarlet fever*, or ordinary tonsillar inflammation, and a wash or gargle may well be combined with its internal administration.

In doses of from 120 to 300 grains, cream of tartar is a good purgative, but is principally used in combination with jalap, which, by stimulating the muscular movements of the small intestines, prevents the probable reabsorption of the watery fluid.

4. We can therefore readily explain, on physiological principles, why alkalies are so useful in hepatic congestion, why they may also stimulate the pancreatic secretion, and why their action is so beneficial in cases of dyspepsia depending on deficient supplies of gastric juice. On these principles, also, we may readily understand the very striking power possessed by a weak solution of potash in arresting the alkaline secre-

tion so freely poured out by the skin in acute eczema.

Kidneys.—Most of the salts of potash, but more especially the acetate, nitrate, citrate, and acid tartrate, are diuretic, and the acetate, bicarbonate, and citrate, being converted into carbonate, speedily render the urine alkaline. Elaborate experiments have been made on the more precise alterations effected in the urine by the salts of potassium. Prof. Parkes tells us that liquor potassæ increases the destructive metamorphosis of the nitrogenous tissues, and their elimination as urea, as well as that of the sulphur in the form of sulphates. The acetate has been shown to diminish the water, urea, and earthy salts; whereas the citrate, according to Dr. Nunneley, increases the water, but diminishes the urea and solids.

Potassium salts are therefore good diuretics in ***heart disease, chronic kidney affections***, and various ***dropsical accumulations***; and their action is much more marked under these conditions than when administered to healthy subjects, since we have seen that the acetate, which is perhaps the most active of the diuretic group, may even check the elimination of water from the kidneys during health. Dr. Roberts, of Manchester, has proposed to dissolve uric acid calculi by keeping the urine alkaline for months with citrate of potash.

Potash may be used under other conditions. Thus in asthma the inhalation of the fumes from burnt blotting-paper soaked in a strong solution of nitrate of potash is often effectual; chlorate of potassium is a useful ingredient in a cough linctus; the citrate is an agreeable febrifuge, and is valuable in many of the feverish and dyspeptic affections of children.

Duckworth (*Practitioner*, May, 1878) highly praises nitre paper in bronchitis, and says that a little Friar's balsam painted over the paper is an improvement. This treatment in asthma often fails from the fumes not being used freely enough.

℞.	Liquoris potassæ	fʒij;	or	8		Gm.
	Tincturæ calumbæ	fʒij;	"	8		"
	Infusi calumbæ	f℥vj;	"	102		"

Fiat mist. f℥j ter die.

Antacid mixture.

℞.	Potassii bicarbonatis	ʒj;	or	4		Gm.
	Potassii acetatis	gr. xv;	"	1		"
	Potassii nitratis	gr. x;	"		65	"
	Aquæ	f℥ij;	"	64		"

Fiat haustus quartis horis sumend.

This constitutes the "full alkaline" treatment rec mended by Dickinson for acute rheumatism, and may prescribed in effervescence.

[℞.	Potassii chloratis	ʒij;	or	8	Gm.
	Syrupi limonis	f℥j;	"	32	"
	Aquæ	f℥iij;	"	96	"

Dose, according to the age of the child: if under years fʒj, from two to ten fʒij, over ten f℥ss, given e three hours, or every half hour in urgent cases. Rec mended as almost specific in diphtheritic croup by Dr M. Drysdale.]

℞.	Potassii chloratis	ʒj;	or	4	Gm.
	Aquæ	f℥vj;	"	192	"
S	f℥ss ter die.				

In ulcerated mouth or gums, or mercurial salivation.

R.	Potassii bicarbonatis	ʒss;	or	2	Gm.
	Aquæ	Oj;	"	500	"

A good lotion in acute eczema.

R.	Potassii acetatis	ʒiss;	or	6	Gm.
	Aceti scillæ	fʒiv;	"	16	"
	Decocti scoparii [Br.] ad f℥vj;		"	192	"

Fiat mist. Dose, f℥j quartis horis.

Diuretic mixture.

℞.	Spiritus ætheris nitrosi	fʒij;	or	8		Gm.	
	Potassii nitratis	gr. xx;	"	1	30	"	
	Decocti scoparii [Br.]	f℥iv;	"	128		"	M.

Fiat mist. Dose, f℥j ter die.

Diuretic.

℞.	Potassii bitartratis	ʒiij;	or	12	Gm.		
	Succi scoparii [Br.]	ʒvj;	"	24	"		
	Aquæ	f℥vj;	"	192	"		M.

Dose, f℥j ter die.

Diuretic.

℞.	Potassii chloratis	gr. xl;	or	2	60	Gm.	
	Glycerini	f℥ss;	"	16		"	
	Morphinæ hydrochlorat.	gr. jss;	"		10	"	
	Syrupi ad	f℥iv;	"	128		"	M.

S. fʒj prout res poscit.

Dr. Douglas Powell's linctus for the chronic throat irritation of consumptive patients.

[Potassii Bichromas.

Potassium bichromate, in powder or strong solution, is a good escharotic and antiseptic application to *warts* and *venereal excrescences.* It is also useful in the treatment of *nasal hypertrophies* applied by means of a probe, to be immediately followed by an alkaline wash. It has been used internally in *secondary syphilis,* as an alterative, given in pill-form with some bitter extract. Occasionally it produces salivation. It acts as an emetic in doses of ¾ gr. In large amounts it is an acrid mineral poison, and causes a burning heat in the mouth, throat, and stomach; excessive and painful vomiting of bloody mucus; convulsions and palsy and death.

Morbid Appearances.—Softening and abrasion of the mucous coat of the stomach and intestines.

Tests.—In substance, by its orange-red color. In solution, by affording a rich red precipitate with nitrate of silver, a bright yellow with acetate of lead, a dingy green color and whitish turbidity with sulphuretted hydrogen.

Treatment.—The use of the potassium or sodium carbonates to neutralize the excess of chromic acid, followed by the administration of emetics. It would also be advisable to employ chalk or magnesia, in connection with milk, or the albumen of eggs.]

Potassii Bromidum.

(Bromide of Potassium is not used externally.)

Constitutional Actions.

Physiological.

1. *On Nervous Function.*—Long continuance in the use of potassium bromide tends to cause a sense of fatigue and general muscular prostration, with giddiness and staggering.

Brain.—The functions of the brain are lessened, and sleep results, depending, like the normal physiological condition, on an anæmic condition of the brain.

Spinal Cord. — Experiment has shown that it lessens and finally abolishes the reflex functions of the spinal cord, voluntary movement, which is at first unimpaired, finally becoming paralyzed. This is probably due to the potash, as potassium iodide and potassium chloride cause much the same symptoms, which are never observed after the administration of the bromide of sodium.

Potassium bromide also lessens the irritability of the sensory nerves.

It has also been observed that the power of voluntary movement persists for some time after the abolition of reflex function, proving that the

Therapeutical.

1. Potassium bromide
gained great repute wit
the last few years in
treatment of a large serie
convulsive and spasmodic
fections, and most especi
in *epilepsy*, it being now t
roughly established that if
get our case sufficiently ea
we may absolutely cure
and even if it is too confirn
for this result we may k
it in check. The cases m
under the influence of
drug are those known as
haut mal, where violent str
gling is followed by comat
sleep; on the other hand,
the *petit mal*, where the
tack is indicated merely
passing unconsciousness,
when the seizures occur pr
cipally at night, the reme
will frequently disappoint

When the remedy is a
ing well in epileptics, we
always readily detect a
cided suppression of ref
sensibility at the back
tongue and fauces, free c
tact with a brush or spat
causing no feeling of naus

Potassium bromide is
lieved to act in *epilepsy*
relieving the spasmodic c

influence of the drug is exerted probably either upon the afferent nerves, or upon those portions of the cord which transmit the impulse from these nerves to the cells presiding immediately over motion.

Sympathetic System. — Potassium bromide is supposed to have a sedative influence over the sympathetic system of nerves; but on this point the evidence is very contradictory.

2. *Effects on Circulation.* —No special action on the heart has been observed save some slight lowering of its action. The smaller arteries have been said to be contracted, the pulse becoming smaller, and we may thus explain the hypnotic action of the drug, the brain being rendered anæmic as in physiological sleep.

traction of a vessel supplying a special vascular brain area which is thus deranged in function.

It is also of great benefit in the various *convulsive seizures of children*, in *laryngismus stridulus*, *night terrors*, and also in those spasmodic symptoms which depend on *meningitis* or *organic brain disease.*

It is of service in *incontinence of urine*, *pertussis*, *cramp of lower limbs*, *chorea*, in *delirium tremens*, and in many of those forms of *mental depression*, *nervous headache*, and vague sensations indicating nervous disturbance, which are so distressing to some women about the *change of life.*

It is said to be a good remedy in *sea-sickness* from the sedative effect on the centre concerned in the reflex act of vomiting.

2. Bromide of potassium is an excellent narcotic, and causes refreshing sleep, more especially in cases of *insomnia* due to worry, mental anxiety, or overwork, a full dose being given at bedtime; and in *acute mania* its use in combination with chloral is highly praised by Clouston.

It is said to heighten the action of opium, and lessen the nausea, giddiness, and faintness occasionally following the use of that drug.

3. Its influence on *digestion* is not marked; for although it sometimes seems to lessen the appetite, this is not a constant result.

4. The effects on the *urinary secretion* have not been thoroughly made out.

5. Bromide of potassium has an undoubted influence over the generative organs, lowering their excitability, and even in large doses suspending their action.

3. Its sedative influence over reflex function has suggested its use in some forms of *dyspepsia*, and this seems to have been successful.

4. It has been much praised by Begbie in *diabetes*.

5. It is useful in *priapism* and in those forms of *menorrhagia* which depend on ovarian irritability, and it has been used with success in the acute stages of *gonorrhœa*, and in *spasmodic stricture*.

Potassium bromide is eliminated from the system by the urine, breath, sweat, and milk, a case being recorded in which the child of a suckling mother taking the salt became covered with acne.

DISADVANTAGES AND CONTRA-INDICATIONS.

We have already noted the peculiar nervous symptoms occasionally caused by the bromides—giddiness, general muscular fatigue, even amounting to actual staggering in some cases. But in addition to this an unpleasant eruption of acne often breaks out on the face, and may arise from a very small dose. If the remedy is persisted in, in spite of this, the whole body may eventually be covered with large and unsightly blotches.

Bromide acne may, in some measure, be prevented by adding a little liq. acidi arseniosi to each dose, and may be removed by the following lotion :—

℞. Sulphuris præcip.	℥iij;	or	12	Gm.	
Spiritus camphoræ	fʒj;	"	4	"	
Aq. calcis	ad f℥iij;	"	96	"	M.

Ft. lotio.
Apply morning and evening.

Sodii bromidum acts much in the same way as potassium bromidum [but is considered to be less depressing to the heart. The ammonium bromide is better where the circulation is defective].

DOSE AND MODE OF ADMINISTRATION.

The dose for epilepsy ranges from 10 to 60 grains, it being necessary to increase the quantity gradually, and continue its use for long periods, even years, occasionally leaving it off for a week or so, after which it seems to regain some of its lost effect.

Dose as a hypnotic, gr. xx ad xxx. In other cases about gr. xx as an average. Children appear to be very susceptible to its use, acne being readily produced in them by moderate doses. As its taste is rather nauseous, we must disguise it thus:—

℞. Potassii bromidi	gr. xxx;	or	2		Gm.	
Syrupi aurantii	fʒj;	"	4		"	
Aquæ aurantii florum q. s. ad	f℥ij;	"	64		"	M.

Fiat haustus horâ somni sumendus.

[℞. Pot. bromidi	℥j;	or	32		Gm.	
Chloral hydratis	℥ss;	"	16		"	
Aquæ camphoræ	℥viij;	"	256		"	M.

Dose, ʒj thrice a day.

Or, give it simply in water.]

℞. Potassii bromidi	ʒiij;	or	4		Gm.	
Morphinæ acetatis	gr. x;	"		65	"	
Glycerini	℥ij;	"	64		"	
Chloroformi	ʒiij;	"	12		"	M.

Recommended by Schrötter as an efficient means for lessening the sensibility of the fauces and larynx previous to operation. Frequent applications should be made by brush.

[A brominized solution of bromide of potassium has been recommended for laryngeal diphtheria or *pseudo-membranous croup*—

℞. Potassii bromidi	ʒj;	or	4		Gm.	
Bromini	♏v;	"		30	"	
Syrupi simplicis	fʒviiss;	"	30		"	
Decocti althææ	℥iij; ʒvj;	"	120		"	M.

Dose, f℥ every hour during urgent symptoms.

For children under one year the quantity of bromine in the mixture should be reduced to 0.10 Gm., and for those from one to four years old to .20 Gm.[1]]

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[1] Redenbacher–Ærtzliches Intelligenzblatt, January 7, 1879. The Practitioner, vol. xxii. p. 208.

Potassii Iodidum (Iodide of Potassium).

(For Constitutional Effects see IODINE, page 342.)

Potassium iodide as an anti-syphilitic may be give doses of from 3 to 30 grains, or even 60, according t judgment of prescribers, it being necessary in obstinate to push the drug very freely.

[The iodide of potassium should be prescribed alon only in combination with other preparations of iodin with corrosive sublimate.

This salt may be given simply dissolved in water, o taste may be well disguised by administering it in comb tion with compound syrup of sarsaparilla, or compound i sion of gentian.

Dr. Taylor, at the meeting of the American Derma gical Association, said that patients would tolerate an o and a half daily and grow fat on it, the only physiolo result being increased urination. He mentioned a cas nodes, where fourteen drachms daily were administe nothing less would give the patient relief at night. thought that in similar cases the addition of bromid potassium, one drachm to seven of the iodide, would b advantage.

He also remarked that he had observed pains in the jo occasionally, even when small doses of iodide were b administered, which were considered as being due to remedies employed. He offered a practical suggestion reference to the prevention of these pains (which are diu and not nocturnal), which was that tincture of colchic and tincture of hyoscyamus, combined with small dose the iodide of potassium, would obviate them. Occasion it is necessary to use camphorated oil, or some warm application externally. The joint trouble is sometimes p articular, sometimes mon-articular.]

[PRINOS—PRINOS (BLACK ALDER).

The bark of Prinos Verticellatus, Linné (Ilex Verticellata, Gray, N. O. Aquifoliaceæ).

An indigenous drug of decided astringent properties, wh make it useful in the form of a decoction, or fluid extr in *gastric disorders* and in *diarrhœa.*]

PRUNUM—PRUNE.

[*The fruit of Prunus domestica, Linné (N. O. Rosaceæ, Amygdaleæ).*

Enters into Confectio Sennæ.]
Prunes are slightly purgative.

[PRUNUS VIRGINIANA—WILD CHERRY.

The bark of Prunus Serotina, Ehrhart (Cerasus Serotina, Loiseleur (N. O. Rosaceæ, Amygdaleæ), collected in Autumn.

OFFICINAL PREPARATIONS, U. S.

Extractum Pruni Virginianæ Fluidum. Dose, ʒss to fʒj (2. to 4. Gm.).

Infusum Pruni Virginianæ (4 per cent.). Dose, f℥j–iij (30. to 96 Gm.).

Syrupus Pruni Virginianæ. Dose, ʒj to f℥ss (4. to 16. Gm.).

Wild cherry bark is tonic and sedative, the freshly prepared preparations containing a small amount of hydrocyanic acid. The syrup, from its pleasant flavor, is much used as an ingredient in cough syrups for *phthisis*, or *chronic bronchitis.*]

[PULSATILLA—PULSATILLA.

The herb of Anemone Pulsatilla and Anemone pratensis, Linné, and of Anemone patens, Linné, var. Nuttalliana Gray (N. O. Ranunculaceæ), collected soon after flowering. It should be carefully preserved, and not kept longer than one year.

Pulsatilla has a reputation among irregular practitioners as an emmenagogue and alterative; its asserted virtues have not stood the test of experience. In large doses it may produce nausea and vomiting.]

[Pulveres.

The officinal POWDERS are—

Pulvis Antimonialis.—James's powder.
" Aromaticus.—Spice powder.
" Cretæ Compositus.

Pulvis Effervescens Compositus.—Seidlitz powders.
" Glycyrrhizæ Compositus.
" Ipecacuanhæ et Opii.—Dover's powder.
" Jalapæ Compositus.—Jalap and cream of tartar.
" Morphinæ Compositus.—Camphor, Glycyrrhiza, Ca Carb.; Morphinæ Sulphas (1 part to 60).
" Rhei Compositus.—Rhubarb, magnesia, and ginger.]

[PYRETHRUM—PYRETHRUM (PELLITOR

The root of Anacyclus Pyrethrum, DeCandolle (N. O. Composi

The ground flower-heads of *pyrethrum roseum* are destructive to insect life, and are sold as Persian Insect der. Pellitory root contains a volatile oil and acrid resi is a sialagogue, and is said to be useful as a local reme neuralgia, paralysis of the tongue, etc. Dose, 15 t grains (1. to 4. Gm.), to be chewed slowly.]

[PYROXYLINUM—PYROXYLIN (SOLUBLE COTTON).

Collodium. (Gun cotton 4, dissolved in ether 70, alcohol 26 parts. For external use as a protective.)

Gun-cotton is white, dry, and entirely soluble in a mi of alcohol and ether. It is inflammable, and violently e sive. It is used in preparing COLLODION (see page 26

QUASSIA—QUASSIA.

[*The wood of Picræna excelsa, Lindley (Quassia excelsa, Swar (N. O. Simarubaceæ).*

OFFICINAL PREPARATIONS, U. S.

Extractum Quassiæ. Dose, gr. j–iij (.06 to Gm.).

Extractum Quassiæ Fluidum. Dose, ♏ v (.30 to 1.30 Gm.).

Tinctura Quassiæ (10 per cent.). Dose, gtt. xx (1.30 to 4. Gm.).]

Physiological Actions.	*Therapeutical Actions.*
The action of quassia is directed to the gastro-intestinal mucous membrane, and it is probable that its intensely bitter taste may stimulate the secretion of gastric juice, as it certainly increases the appetite.	Quassia is much used as a tonic in *dyspepsia*, want of appetite, and general debility. Having no aromatic flavor, it is sometimes badly borne by weak stomachs, but, being very cheap, it is largely prescribed in dispensary practice, more especially in combination with iron.
Quassia is destructive to many of the lower forms of animal life.	It is therefore of service, given as an enema, for the destruction of *thread worms*.

QUERCUS ALBA—WHITE OAK.

[*The bark of Quercus alba, Linné (N. O. Cupuliferæ).*]

Oak bark contains tannic and gallic acids, and the decoction is therefore of some value as an astringent in relaxed throat, leucorrhœa, etc.

[QUILLAIA—QUILLAIA (SOAP BARK).

The bark of Quillaia Saponaria, Molina (N. O. Rosaceæ, Roseæ).

Quillaia contains saponin and has been recommended as a substitute for senega as an expectorant. It is also diuretic and alterative. Its solutions froth easily when shaken (hence its name of soap-tree bark), and its tincture is a good addition to dentifrices, or mouth-washes. It is irritating to the mucous passages, and has been used as a snuff in *coryza*.]

[RESINA—RESIN (COLOPHONY).

The residue left after distilling off the volatile oil from turpentine.

Ceratum Resinæ (Resin 35, yellow wax 15, lard 50 parts).

Linimentum Terebinthinæ (Resin Cerate 65, Oil of Turpentine 35 parts).

Emplastrum Resinæ (Adhesive Plaster).

Enters into Ceratum Cantharidis, Ceratum Extracti tharidis, Ceratum Sabinæ, and Emplastrum Hydrargyr

Has no great therapeutic interest, except in its pha ceutical relations. It has been recommended in five t grain doses for chronic diarrhœa, but is seldom used i nally.]

[Resinæ.

The officinal RESINS are—

Resina Copaibæ
" Jalapæ
Resina Podophylli
" Scammonii.]

RHEUM—RHUBARB.

[*The root of Rheum officinale, Baillon, and of other undetermined s of Rheum* (*N. O. Polygonaceæ*).

OFFICINAL PREPARATIONS, U. S.

Extractum Rhei. Dose, gr. ij–x (.12 to .65 Gr

Extractum Rhei Fluidum. Dose, gtt. x–xxv to 1.60 Gm.).

Infusum Rhei (ʒiv to Oj). Dose, f℥ij–iv (6 128. Gm.).

Pilulæ Rhei (each gr. iij). Dose, 1 to 3 pills.

Pilulæ Rhei Compositæ (Rhei gr. ij, aloes gr myrrh gr. j). Dose, 2 to 4 pills.

Pulvis Rhei Compositus (Rhubarb 25, mag 65, and ginger 10). Dose, ʒss–j (2. to 4. Gm.).

Syrupus Rhei (9 per cent.). Dose, fʒss–ij (4. Gm.).

Syrupus Rhei Aromaticus (10 per cent. of Tincture of Rhubarb). Dose, for infant, fʒ (4. Gm.).

Mistura Rhei et Sodæ (Sod. bicarb., fl. ext. sp. peppermint āā 30, water 10). Dose, ʒss–ij (2. t Gm.).

Tinctura Rhei (12 per cent.). Dose, f℥ss–j (1 32. Gm.).

Tinctura Rhei Aromatica (20 per cent.). D f℥ss–j (16. to 32. Gm.).

Vinum Rhei (10 per cent.). Dose, fʒj–iv (4. to 16. Gm.).

Tinctura Rhei Dulcis (8 per cent.). Dose, ʒij–iij (8 to 12 Gm.).]

CONSTITUTIONAL ACTION.

Physiological.

Like castor oil, rhubarb combines some astringent properties with its undoubted cathartic effects; and whilst the first-mentioned action is no doubt due to the tannin which it contains, investigators have not yet determined on what special ingredient its purgative powers depend.

When taken in considerable doses, it not only stimulates the peristaltic movements of the small intestine, and more especially the duodenum, but it moistens and softens the feces, and increases decidedly the secretion of bile. According to Rutherford, it is a certain though not a powerful hepatic stimulant. The bile secreted under its influence has the normal composition.

Therapeutical.

The astringent action of rhubarb renders it most useful in those forms of *diarrhœa* depending on the presence of indigestible matters in the alimentary canal, and where removal of the exciting cause, followed by rest of the irritated intestine, is sufficient to effect a cure.

It is a good tonic in some cases of *dyspepsia*, and forms a good purgative for children, more especially when combined with magnesia, as in the well-known Gregory's Powder [Pulv. Rhei Comp.].

Prof. Rutherford's experiments on its cholagogue action would indicate its employment in *jaundice* and deficient secretion of bile.

The chrysophanic acid, or yellow coloring matter of rhubarb, is readily absorbed, and rapidly given out by the intestines, milk, sweat, and urine, to which latter secretion it imparts a yellow tinge, turning red on the addition of an alkali. [For use of chrysophanic acid in skin diseases, see CHRYSAROBINUM, page 250.]

DOSE, MODE OF ADMINISTRATION, ETC.

The smell and flavor of rhubarb are excessively nauseous, and, although we cannot effectually disguise either, we may at least render the drug moderately palatable by the fo ing formulæ :—

℞. Infusi rhei	f℥ij ;	or	64	Gm.
Potassii bicarbonatis	ʒj ;	"	4	"
Tincturæ cinnamomi	f℥ij ;	"	8	"
Syrupi simplicis	fʒvj ;	"	24	"

Dose, fʒj secundâ quâque horâ.

In the diarrhœa of children.

℞. Pulveris rhei	gr. xxx ;	or	2	Gm.
Sodii carbonatis	gr. xv ;	"	1	"
Spiritus myristicæ	♏xxx ;	"	2	"
Syrupi zingiberis	fʒj ;	"	4	"
Aquæ menthæ piperitæ q.s.ad	f℥iss ;	"	48	"

Misce, fiat haustus nocte sumendus.

Antacid and purgative.

[RHUS GLABRA—RHUS GLABRA (SUMAC

The fruit of Rhus Glabra (N. O. Terebinthaceæ, Anacardieæ

Extractum Rhois Glabræ Fluidum. Dose, ii (4–8 Gm.).

Sumach contains tannic acid, and in the form of extract of the fruit, it is a good addition to mouth-wash as a spray in *pharyngitis*. It has also been adminis internally in *diarrhœa*, and in *strangury*. In some diseases, and in ulcers it may be applied diluted as a w

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[RHUS TOXICODENDRON—RHUS TOXICODENDRON (POISON IVY).

The fresh leaves of Rhus Toxicodendron, Michaux (Rhus Toxicode and Rhus Radicans) (N. O. Terebinthaceæ, Anacardieæ).

The fresh leaves contain an acrid principle, toxicode acid, which causes vesicular inflammation and swellin the skin ; for which alkaline solutions of carbonate of p sium or bicarbonate of sodium may be used to neutr the poison, followed by astringents. A tincture of the le was formerly used in paralysis, and in chronic rheumat The dried leaves are worthless.]

ROSA CENTIFOLIA—PALE ROSE.

The petals of Rosa centifolia, Linné (N .O. Rosaceæ, Roseæ).

ROSA GALLICA—RED ROSE.

The petals of Rosa Gallica, Linné, collected before expanding (N. O. Rosaceæ, Roseæ).

OLEUM ROSÆ.

The volatile oil distilled from the fresh flowers of Rosa Damascena, Miller (N. O. Rosaceæ, Roseæ).

OFFICINAL PREPARATIONS, U. S.

Aqua Rosæ (Rosa centifolia). As a vehicle.

Unguentum Aquæ Rosæ (Cold Cream). External use.

Confectio Rosæ. As an excipient for pills.

Extractum Rosæ Fluidum (containing glycerine and dilute alcohol). As a vehicle.

Mel Rosæ. (Honey of Roses.) As a vehicle.

Syrupus Rosæ. As a vehicle.

Red Rose also enters into Pilulæ Aloës et Mastiches, and Pale Roses into Syrupus Sarsaparillæ Compositus.]

The various preparations of roses have little therapeutical significance. The cabbage-rose is used in the form of rose-water as an elegant vehicle; the red-rose petals as confection constitute a convenient basis for a pill mass, whilst, combined with sulphuric acid in the acid infusion, they make an excellent gargle, either alone or with alum, whilst they may occasionally be of service in concealing the nauseous flavor of sulphate of magnesia.

Hips [dog-rose, *rosæ caninæ fructus*, Br.] are also slightly astringent.

ROSMARINUS—ROSEMARY.

[*The leaves of Rosmarinus officinalis, Linné (N. O. Labiatæ).*

Oleum Rosmarini. Used in Linimentum Saponis.

Rosemary, lavender, and peppermint are agreeable carminatives, much used in combination with other stimulant drugs. (The oil of rosemary is one of the constituents of the Compound Tincture of Lavender, Linimentum Sa Spiritus Odoratus and Vinum Aromaticum.)]

[RUBUS—RUBUS (BLACKBERRY).

The bark of the root of Rubais villosus, Aiton, Rubus Canadensis, and Rubus trivialis, Michaux (N. O. Rosaceæ, Dryadeæ).

OFFICINAL PREPARATIONS, U. S.

Extractum Rubi Fluidum. Dose, f℥ss (2. G
Syrupus Rubi (20 per cent. fluid extract). f℥j–ij (4. to 8. Gm.).

Much prized as a tonic and astringent, and particu adapted to the *diarrhœa* of relaxation. A decoction i made in domestic practice (℥j to Oiss boiled down to a of which f℥j–ij (32. to 64. Gm.) may be given three o times daily.]

RUBUS IDÆUS—RASPBERRY.

The fruit of Rubus idæus, Linné (N. O. Rosaceæ, Dryadeæ)

Syrupus Rubus Idæi. As a vehicle.

Raspberry is used for flavoring. In combination vinegar and sugar it makes an agreeable acid hot-we drink. It possibly may be useful in scorbutus.]

RUMEX—RUMEX (YELLOW DOCK).

The root of Rumex Crispus, Linné, and of other species of Rum (N. O. Polygonaceæ).

Extractum Rumicis Fluidum. Dose, ℨss–j 4 Gm.).

Rumex or yellow dock contains chrysophanic acid, nic acid, etc., and possesses alterative tonic properties. has been used in the fluid extract (ℨss–j) in *dyspepsia liver disorders.* Also in various syphilitic and scrofu affections, skin diseases, glandular swellings, etc.]

[RUTÆ OLEUM—OIL OF RUE.

A volatile oil distilled from Ruta Graveolens, Linné (N. O. Rutaceæ, Ruteæ).

The oil of rue is stimulant, and, in large doses, is an acro-narcotic poison. Moderate doses have some emmenagogue effects, and, in cases of poisoning, miscarriage generally occurs.]

SABINA—SAVINE.

[*The tops of Juniperus Sabina, Linné (N. O. Coniferæ).*

Dose, in substance, gr. v–xv (.30 to 1 Gm.).

OFFICINAL PREPARATIONS, U. S.

Ceratum Sabinæ (Fluid extract, 25 parts; Resin Cerate, 90 parts). External use.

Extractum Sabinæ Fluidum. Dose, gtt. v–xv (.30 to 1. Gm.).

Oleum Sabinæ. Dose, gtt. ij–v (.12 to .30 Gm.).]

LOCAL EFFECTS.

Savine used to be applied in the form of ointment to blistered surfaces, with the view of encouraging suppuration, but this barbarous process is now happily abandoned. [It is stimulant and rubefacient, and is sometimes applied to warts, ulcers, and diseases of the scalp.]

INTERNAL USES.

Physiological.	*Therapeutical.*
Savine is a gastro-intestinal irritant, causing in large doses vomiting and purging; and it has also a powerful stimulating influence on the uterus.	Savine is sometimes used with criminal intent to produce abortion, and death has occasionally resulted from its irritant action. It is rarely used in medicine, although some authorities express faith in its emmenagogue powers.

SACCHARUM—SUGAR.

[*The refined sugar of Saccharum officinarum, Linné* (*N. O. Graminaceæ*).

($C_{12}H_{22}O_{11}$; 342.)

OFFICINAL PREPARATIONS.

Syrupus. (Sugar 65 parts, water q. s. ad 100 by weight.)

Sugar enters into Pilula Ferri Carbonatis, Pilulæ Iodidi, and the various syrups.]

Sugar is principally used in the form of syrup as a fla ing adjunct. [Molasses is laxative; and molasses ca sometimes forms a good substitute for more active reme in treating *constipation* in children.]

SACCHARUM LACTIS—SUGAR OF MILK.

[*A peculiar crystalline sugar obtained from the whey of cow's mil evaporation and purified by recrystallization.*

Milk, and sugar of milk, have no special therapeut properties apart from their nourishing qualities. [Suga milk on account of its dryness and hardness is useful in pl macy as the vehicle for other substances in the form of tr rates, abstracts, etc.]

[SALIX—SALIX (WILLOW).

The bark of Salix alba, Linné, and of other species of Salix (*N. O. Salicaceæ*).]

SALICINUM—SALICIN.

[*A neutral principle prepared from the bark of Salix Helix, Linné, of other species of Salix* (*N. O. Salicaceæ*).

Salicin acts as a bitter tonic, and has some antiseptic antiperiodic qualities, which have caused it to be used, w only partial success, in the treatment of malarial affectio Recently, however, it has been most extensively emplo as a remedy for acute rheumatism, on the recommendat of Dr. Maclagan, who holds it to be safer than salicylic ac as not tending to depress the heart, the dose being from 10 to 50 grains every two, three, or four hours; and if we wish to get the full antipyretic effect of the remedy we must prescribe it boldly in 2 or 3 doses of 30 to 50 grains repeated at hourly intervals. He also praises it highly in *periodic neuralgia* and *coryza*.

SALVIA—SALVIA (SAGE).

The leaves of Salvia officinalis, Linné (N. O. Labiatæ).

Officinal Preparation, U. S.

Vinum Aromaticum. (See page 95.)

Sage is tonic, astringent, and aromatic. It has been used as a carminative in debility of the stomach with flatulence, and the infusion is a useful gargle, to which honey, alum, or vinegar may be added, but it strikes a black color with iron (it contains tannic acid). A weak infusion is sometimes used as a drink in fevers to allay nausea.]

SAMBUCUS—SAMBUCUS (ELDER).

[*The flowers of Sambucus Canadensis, Linné (N. O. Caprifoliaceæ).*]

Dose, gr. xxx–ʒj (2 to 4 Gm.).

Only used in the form of aquæ sambuci [Br.], which is a cooling and pleasant lotion. [The root of *Sambucus nigri* (common black elder-berry) acts as a hydragogue cathartic. The expressed juice of the root may be given in doses of ℥j–ij until salivation, vomiting, and purging occur; or a decoction may also be made. A hot infusion of sambucus is diaphoretic, diuretic, and may be emetic.]

SANGUINARIA—SANGUINARIA (BLOODROOT).

[*The rhizome of Sanguinaria Canadensis, Linné (N. O. Papaveraceæ), collected in autumn.*

Officinal Preparations, U. S.

Acetum Sanguinariæ (10 per cent.). Dose, ♏xv–xxx (1. to 2. Gm.).

Tinctura Sanguinariæ (15 per cent.). Dose, xx–xl (1.30 to 2.60 Gm.).

Extractum Sanguinariæ Fluidum. Dose, ♏ (.13 to .30 Gm.).]

This is a substance of energetic physiological proper causing clonic convulsions of spinal origin, diminisl reflex action, weakening the force of the heart, and les ing arterial tension, lowering the temperature, dilating pupil, and finally causing death by respiratory paralysis. also possesses violent emetic properties, and stimulates patic secretion. It has been used more especially in Amer and has been found useful in atonic dyspepsia and duode jaundice, in chronic catarrh, and some stages of bronchi and may be given in doses of 5 to 10 minims of the ti ture three times a day. [The powdered root has been u as a stimulant in indolent ulcers, which has led some to c sider it a specific for *cancer*.]

[SANTALUM RUBRUM—RED SAUNDERS.

The wood of Pterocarpus santalinus, Linné (Leguminosæ, Papilionace

Used only in pharmacy as a coloring agent, and ent into Tinctura Lavandulæ Compositus.]

SANTONICA—SANTONICA.

[*The unexpanded flower heads of Artemisia Maritima, Var. Stechmanniana, Besser (N. O. Compositæ).*

Santoninum. A neutral principle prepared from Sa tonica. Dose, gr. ss–iij (.03 to .20 Gm.).

OFFICINAL PREPARATIONS, U. S.

Sodii Santoninas. Dose, gr. ij–x (.13 to .65 Gm.)

Trochisci Santonini (each, gr. j) Dose 1 to 3.]

LOCAL ACTION.

Santonin has no local action.

INTERNAL ACTIONS.

Physiological.

I. *Brain and Nervous System.*—It is no doubt due to some influence on the brain that the peculiar derangement of vision, which is sometimes found accompanying the use of santonin, depends; as no staining of the ocular media has been observed, and slight hyperæmia of the retina is the only apparent local effect. Some observers note the first stage to be an exaggerated appreciation of the violet rays of the spectrum, but the most evident alteration in sight consists in very distinct yellow vision, all white objects being seen in a more or less pronounced saffron tinge, which begins about half an hour after the drug is swallowed. Associated with this we find a diminished or even abolished appreciation of the violet rays of the spectrum. A good deal of lassitude and mental depression usually follows the use of this medicine, and it must be cautiously pushed, as large doses have occasionally proved fatal from tetanic spasms and convulsions and coma.

II. *Respiration and Circulation.*—No special influence on these functions has been noted. [In poisoning there is accelerated and

Therapeutical.

I. Santonin has been recommended as a remedy for some affections of the optic nerve, but no trustworthy evidence has yet been adduced of its efficacy.

Santonin has not been used in any form of nerve disease, but it seems at least possible that it might prove of service in some forms of so-called *color-blindness.*

CAUTIONS. MODE OF ADMINISTRATION.

[Binz has related a case of santonin-poisoning in which, apparently, a small dose produced serious symptoms. Two lozenges, containing less than a grain, were followed, ten hours afterwards, by a convulsive attack which recurred several times during the next few days. The child never had convulsions before. It would seem as if the troches must have contained more of the drug than was suspected.[1]]

As already observed, serious symptoms have been observed to follow the use of santonin, and we shall do well to warn our patients of the urinary irritability which is invariably experienced in greater or less degree. Dr. Sieveking has also drawn attention to the occurrence of urticaria following the administration of santonin, and Drs. Dyce and Ogson have given a suggestive hint by pointing out that its long-continued use causes the development of cataract in young animals.

[If long retained in the system santonin becomes converted into *xanthopsin*, which then appears in the urine. Poisonous symptoms are produced by this new substance, but they may be prevented by combining the santonin with an antacid and purgative, and in practice it is found that they are never produced when the santonin is combined with calomel and soda.]

Its taste is not unpleasant, but as it is insoluble in water it may be mixed with jam or treacle, or simply sprinkled on bread and butter [or we may use the officinal lozenge].

SAPO—SOAP.

[*Soap prepared from soda and olive oil.*]

[SAPO VIRIDIS—GREEN SOAP.

Soap prepared from potassa and fixed oils.

OFFICINAL PREPARATIONS, U. S.

Emplastrum Saponis.
Linimentum Saponis.
Tinctura Saponis Viridis. (Green soap 65, oil of lavender 2, alcohol q. s. ad 100.)

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[1] [Phil. Med. Times, Aug. 1877, p. 551.]

Enters into Extractum Colocynthidis Compositum, Pilulæ Aloes, Pil. Aloes et Asafœtidæ, Pil. Asafœtidæ, Pil. Opii, Pil. Rhei, Pil. Rhei Compositæ, and Pil. Scillæ Compositæ.]

Soap is not applied to any therapeutical purpose, except the hard variety, which enters into the construction of some pill masses, and both the hard and soft aid in the construction of liniments and plasters.

[Soft, or potassa, soap, green soap, *sapo viridis*, has been recommended by Hebra in alcoholic solution, under the name of *spiritus saponis kalinis* (2 pts. soap, 1 pt. alcohol), in the treatment of *chronic eczema*.]

SARSAPARILLA—SARSAPARILLA.

[*The root of Smilax officinalis, Kunth, Smilax medica, Schlechtendal et Chamisso, and of other undetermined species of Smilax (N. O. Smilaceæ.)*

OFFICINAL PREPARATIONS, U. S.

Decoctum Sarsaparillæ Compositum (two parts of sarsaparilla, two each of sassafras, guaiac and licorice, one of mezereum and water q. s. to make 100 parts). Dose, f℥ij–iv (60. to 128. Gm.).

Extractum Sarsaparillæ Fluidum. Dose, fʒss–j (2. to 4. Gm.).

Extractum Sarsaparillæ Compositum Fluidum. Dose, fʒss–j (2. to 4. Gm.).

Syrupus Sarsaparillæ Compositus (℥iv to Oj). Dose, fʒj–iv (4. to 6. Gm.).]

INTERNAL ACTIONS.

Physiological.

Sarsaparilla has been credited with diaphoretic, diuretic, and other powers; but none of these have stood the test of rigid investigation, and it is difficult to find any convenient heading under which to class this popular drug, unless we shelve the

Therapeutical.

Nor is it easier to give any decided opinion regarding its therapeutical merits; for whilst some surgeons, like the late Mr. Syme, hold it to be quite useless, others believe it to be of service in constitutional *syphilis*, *chronic skin disease*, etc.

difficulty by calling it an "alterative."

Experiment has shown that this expensive and fashionable drug is quite devoid of all physiological properties.

One point of difficulty in arriving at any decided conclusion is, that it is usually prescribed along with three other drugs in the compound decoction; but the late Mr. Gascoyne used to say that he had found great benefit in the treatment of the *tertiary forms of syphilis* by giving full doses of the freshly made infusion.

SASSAFRAS—SASSAFRAS.

[*The bark of the root of Sassafras officinalis, Nees (N. O. Lauraceæ).*

SASSAFRAS MEDULLA—SASSAFRAS PITH.

The pith of Sassafras officinalis (N. O. Lauraceæ).

Oleum Sassafras. Dose, gtt. ij–x (.12 to .62 Gm.).

Mucilago Sassafras Medullæ (℥ij to Oj). External use.

Enters into Extractum Sarsaparillæ Compositum Fluidum, and Decoctum Sarsaparillæ Compositum and Syrupus Sarsaparillæ Compositus.]

This plant seems only to have acquired any therapeutic importance by reason of its combination with other drugs in the Decoctum Sarsaparillæ Comp. [The mucilage may be used as a soothing application in conjunctivitis. The oil is a pleasant flavoring substance, and is carminative.]

SCAMMONIUM—SCAMMONY.

[*A resinous exudation from the root of Convolvulus Scammonia (N. O. Convolvulaceæ).*

Dose, in substance, gr. v–xv (.30 to 1. Gm.).

OFFICINAL PREPARATIONS, U. S.

Resina Scammonii. Dose, gr. iv–viij (.25 to .50 Gm.).

Extractum Colocynthidis Compositum. Dose, gr. v–xxx (.30 to 2. Gm.). (See COLOCYNTH.)]

INTERNAL EFFECTS.

Physiological.

Scammony causes a good deal of irritation of the alimentary canal, and produces copious watery stools, often attended with griping. For its proper action, previous solution in the bile, and combination with its soda, are requisite. The experiments of Rutherford have proved that scammony is a powerful intestinal, but a feeble hepatic stimulant.

Therapeutical.

Scammony is a purga used in *cerebral* and *drops affections;* and being c paratively tasteless, it is adapted for children, forn a convenient purgative the removal of *ascarides.* may be given in milk.]

SCILLA—SQUILL.

[*The sliced bulb of Urginea Scillæ, Steinheil* (*N. O. Liliaceæ*).

Dose, in substance, gr. ij (.12 Gm.).

Active principles, scillitoxin and skulein (or scillitin), latter being probably impure scillitoxin.

OFFICINAL PREPARATIONS, U. S.

Acetum Scillæ (10 per ct.). Dose, ♏x–ʒss (.65 2. Gm.).

Syrupus Scillæ (Acetum Scillæ with sugar). Do fʒss–j (2. to 4. Gm.).

Syrupus Scillæ Compositus (Tartar emetic gr and senega and squill, each 30 grs. to the f℥j). Dose, x–fʒj (.65 to 4. Gm.).

Tinctura Scillæ (15 per cent.). Dose, ♏x–xx (to 1.30 Gm.).

Extractum Scillæ Fluidum. Dose, ♏ij–iij (to .20 Gm.).]

INTERNAL EFFECTS.

Physiological.

In large doses, squill may act as an emetic, and cause

Therapeutical.

Squill is never used as emetic [except in its com violent vomiting with purging.

It also stimulates the bronchial mucous membrane, and increases the urinary secretion.

[Scillitoxin, or scillain, is classed among the cardiac tonics by Brunton.]

nation with tartar emetic as "Coxe's Hive Syrup" (Syrupus Scillæ Compositus), which has been given as a depressing emetic in drachm or half drachm doses in *spasmodic croup*. It may be repeated at short intervals, until vomiting occurs.]

It is, however, a good expectorant, increasing the bronchial secretions, and is one of the most universal additions to prescriptions for the relief of various chronic lung affections, as *bronchitis*, and also in *whooping-cough*.

It is also a tolerably efficient diuretic, only to be used, however, when no irritation exists about the kidneys.

SCOPARIUS—BROOM.

[*The tops of Sarothamnus Scoparius, Koch* (*N. O. Leguminosæ, Papilionaceæ*).

LOCAL EFFECTS.

No local action has been described.

CONSTITUTIONAL ACTIONS.

Scoparius has some influence over the digestive and secreting organs, causing, in large doses, vomiting and purging, but in smaller increasing very considerably the urinary water. Two active principles have been extracted from the drug, regarding whose physiological actions some difference of opinion

Scoparius is an excellent diuretic, and is largely used for the purpose of removing dropsical accumulations. If we can succeed in stimulating the kidneys effectually by a combination of this and other drugs, we may hope to hold in check and disperse the *anasarca* of cardiac and chronic kidney-disease, and exists. Thus SCOPARINE is believed by one class of observers to be the diuretic factor in broom-tops, whilst others assert that it has no such property. SPARTEINE has also been very variously described, but the balance of testimony goes to show that it has very definite toxic powers, lowering the reflex action of the spinal cord, paralyzing the motor nerves, suspending the electrical excitability of the vagus, and finally causing death by respiratory paralysis. to aid the removal of watery fluid of *hydrotho* and *ascites*. [An infusio scoparius (℥j to Oj), in c junction with purging compound jalap powder, often used in *cardiac dro* to relieve an overloaded ri side of the heart, with mi insufficiency.]

[Sparteine sulphate is c sidered a cardiac stimul and tonic resembling d talis, and is recommended Sée in *weak* and *irregu* *heart* in daily dose of .05 .25 Gm.][1]

DOSE AND MODE OF ADMINISTRATION.

Scoparius is seldom prescribed alone, but is most usua made the basis of diuretic mixtures, on the well-known pr ciples of combination, which is here of essential service.

℞. Potassii acetatis	ʒiss;	or	6	Gm.
Aceti scillæ	f℥iv;	"	16	"
Decocti scoparii [Br.] q. s. ad	f℥vj:	"	192	"

Fiat mistura. Capiat unciam unam quartis horis.

℞. Tincturæ digitalis	♏x;	or		65 Gm.
Spiritûs ætheris nitrosi,				
Spiritûs juniperi comp.,	āā fʒss;	"	2	"
Succi scoparii [Br.]	fʒj;	"	4	"
Aquæ q. s. ad	f℥j;	"	32	"

S. Fiat haustus, ter die sumendus.

[SCUTELLARIA—SCUTELLARIA (SKULLCAP

Scutellaria lateriflora, Linné (N. O. Labiatæ).

OFFICINAL PREPARATION.

Extractum Scutellariæ Fluidum. Dose, fʒs (2 to 4 Gm.).

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[1] [See Philadelphia Medical Times, vol. xvii. p. 20.]

Skullcap has a bitter taste and probably contains a bitter principle. The eclectic preparation *Scutellarin* is an impure extract "probably devoid of medicinal properties.[1]]"

SENEGA—SENEGA.

[*The root of Polygala Senega* (*N. O. Polygalaceæ*).

Dose, in substance, gr. xx (1.30 Gm.).

OFFICINAL PREPARATIONS, U. S.

Abstractum Senegæ. Dose, gr. v–x (.30 to .65 Gm.).

Extractum Senegæ Fluidum. Dose, ♏x–xxx (.65 to .2 Gm.).

Syrupus Senegæ. Dose, f℥j to ij (4 to 8 Gm.).

It also enters into Syrupus Scillæ Compositus.]

LOCAL EFFECTS.

No external or local action has been described.

CONSTITUTIONAL ACTIONS.

Physiological.

The principal action of senega is that of stimulating the mucous membrane of the bronchial tubes, and possibly, by a tonic influence on their muscular tissues, facilitating the expulsion of their contents. It has also been accredited with diaphoretic, diuretic, and emmenagogue properties, but is seldom employed in any other capacity than as an expectorant. [The active principle is *senegin* or *polygalic acid*, which appears to be identical with *saponin*; it forms a soapy emulsion with hot water.]

Therapeutical.

Senega is of great service in the more chronic conditions of *pneumonia* and *bronchitis*, where it seems to help the patient to get rid of the large quantities of secretion frequently accumulated within the lungs. Theoretically at least, its stimulating properties would contra-indicate its use in the more acute pulmonary affections, but in the later stages of bronchitis, and more especially those cases occurring among the very old, or young, it is of real value.

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[1] [Oldberg & Wall, Companion to the U. S. Pharmacopœia.]

DOSE AND MODE OF ADMINISTRATION.

The infusion is the preparation most commonly emplo and it is generally combined with carbonate of ammor and other expectorants. Thus :—

℞.	Ammonii carbonatis	gr. iv ;	or		25	G
	Tincturæ scillæ	♏xv ;	"	1		"
	Tinct. opii camphorat.	♏xxv ;	"	1	60	"
	Extracti glycyrrhizæ	gr. v ;	"		30	"
	Infusi senegæ [Br.] q. s. ad	f℥j ;	"	32		"

Fiat haustus ter die sumendus.

SENNA—SENNA.

[*The leaflets of Cassia acutifolia, Delile (Alexandria Senna), a Cassia elongata, Lémaire-Lisancourt (India Senna), (N. O. Leg nosæ, Cæsalpineæ).*

OFFICINAL PREPARATIONS, U. S.

Confectio Sennæ. Dose, ʒj–ij (4 to 8 Gm.).

Extractum Sennæ Fluidum. Dose, fʒj–iv (16. Gm.).

Infusum Sennæ Compositum (6 per cent.). D f℥ij–iv (64. to 128. Gm.).

Syrupus Sennæ (33 per cent.). Dose, fʒj–ij (8. Gm.).

Pulvis Glycyrrhizæ Compositus (Senna licorice 16, fennel 8, washed sulphur 8, sugar 50 par Dose, fʒj–ij (4 to 8 Gm.).

It also is one of the constituents of Compound Syru Sarsaparilla.]

INTERNAL EFFECTS.

Physiological.

Senna irritates the small intestine, causing copious, thin, yellow evacuations, and stimulating the peristaltic movements of the bowel.

"It is an hepatic stimulant of very feeble power, rendering the bile more watery." (Rutherford.)

Therapeutical.

Senna is a most use purgative, ranking among cathartics with slightly d tic tendencies, and it may prescribed in simple *con pation*, in *dyspepsia*, and a large variety of conditi where rapid and effect unloading of the bowels required.

DOSE AND MODE OF ADMINISTRATION.

Senna is seldom prescribed alone, as it is then apt to cause irregular contraction of the intestines and griping. It is therefore usually combined either with other purgatives, as magnesii sulph. (black draught), or with various aromatics, as in the confection and compound licorice powder.

Cassia and tamarinds have both a slightly purgative action, but are only used as ingredients in various compound preparations, as the confection of senna. [The syrup of senna is a good purgative for young children. It makes a good emulsion with castor oil.]

SERPENTARIA—SERPENTARIA (VIRGINIA SNAKEROOT).

[The rhizome and rootlets of Aristolochia Serpentaria, Linné, and of Aristolochia reticulata, Nuttall (N. O. Aristolochiaceæ).

OFFICINAL PREPARATIONS, U. S.

Extractum Serpentariæ Fluidum. Dose, gtt. xx–xxx (1.30 to 2. Gm.).

Tinctura Serpentariæ (10 per cent.). Dose, fʒj–ij (4. to 8. Gm.).]

This drug is probably a bitter tonic, but the other virtues with which it has been credited seem to rest on no very stable foundation. [It belongs to the class of the aromatic bitters, and is a good addition to other tonics, as cinchona, and is included in the composition of the popular Huxham's tincture—Tinctura Cinchonæ Comp.]

SEVUM—SUET.

[The internal fat of the abdomen of Ovis Aries, Linné (Class Mammalia, Order Ruminantia) purified by melting and straining.

Used only in pharmacy, and as an ingredient in Unguentum Hydrargyri and Ung. Picis Liquidæ.

An ointment made by adding calomel gr. v–x to suet ℥j is used with good effect in *eczema capitis.*]

SINAPIS ALBA—WHITE MUSTARD.

The seed of Sinapis alba, Linné (Brassica alba, Hooker filius e Thompson) (N. O. Cruciferæ, Siliquosæ).

SINAPIS NIGRA—BLACK MUSTARD.

The seed of Sinapis nigra, Linné (Brassica nigra, Koch), (N. O. Cruciferæ, Siliquosæ).

OFFICINAL PREPARATIONS, U. S.

Chartæ Sinapis. Mustard papers (4 inches squar

Oleum Sinapis Volatile. External use.

Linimentum Sinapis Compositum (Vol. oi mustard 3, ext. mezereum 2, camphor 6, castor oil 15, a hol q. s. ad 100). External use.]

LOCAL ACTIONS.

Physiological.

Mustard applied to the skin causes a vivid redness, with violent smarting and itching, and, if the application be continued too long, vesication may follow, and even troublesome ulceration. [This is said not to happen when mustard papers are used, or when tissue paper is placed on the front of the poultice.]

2. [The irritation of the peripheral extremities of the sensory nerves in the skin by

Therapeutical.

Mustard is used, first,
the relief of pain, and t
can be no doubt that ben
is thus derived in many
vous, rheumatic, and infl
matory affections. In *neu*
gia, lumbago, sciatica, p
rodynia, pleurisy, pneu
nia, peritonitis, colic, an
vast variety of painful
orders, we may expect
alleviate suffering in s
measure by the use of s
pisms, and at other times
use this mode of draw
blood to the surface, and
relieving the congestion
deeper parts, on the princ
referred to under the head
of "Counter-irritation."

2. Mustard poultices
most valuable in arousing
tients from the dangerous

the action of the volatile oil, is reflected to the centres from which these nerves arise, producing revulsive effects; and, by reflex action through the vaso-motor nerves, it thus influences the conditions of vascularity and nutrition of adjacent organs, the brain or the lungs, for instance.]

matose condition into which they occasionally drift in the course of some of the acute inflammations; and sinapisms applied to the feet and calves are of service in the stupor of *narcotic poisoning* and in *uræmic coma.*

Mustard baths may be employed to bring back the eruption of some abortive cases of the exanthemata, or as a stimulant in *acute bronchitis*, or in the *convulsions of children.*

CONSTITUTIONAL ACTIONS.

Physiological.	*Therapeutical.*
Digestive Organs.—Mustard increases the appetite by irritating the mucous membrane of the stomach, but does not increase the secretion of gastric juice.	Mustard is extensively used as a dietetic condiment.
It acts as a prompt and effectual emetic of the direct class.	This emetic power is of great value in cases of poisoning, as mustard is always at hand, and can be used at once.

MODE OF ADMINISTRATION.

A mustard poultice must be made with cold water, for we know that hot water dissipates the volatile oil on which the counter-irritation depends, vinegar destroys it, and alcohol prevents its formation. It must be kept on from twenty minutes to half an hour, according to circumstances. [Very strong mustard may have too much effect upon tender skins, and it should always be mixed with flour or starch for children.]

SODIUM.

[OFFICINAL PREPARATIONS, U. S.

Soda. Caustic Soda.

Liquor Sodæ (4 per cent.). Dose, well diluted, ♏
(.30 to .65 Gm.).

Sodii Acetas. Acetate of Sodium. Dose, gr. v
(.30 to 2.60 Gm.).

Sodii Benzoas. Benzoate of Sodium. Dose, gr. x-
(.65 to 4. Gm.).

Sodii Bicarbonas Venalis. (Used in making S
Bicarbonas.)

Sodii Boras (Borax). Dose, gr. x–xl (.65 to 2.60 Gr

Sodii Bromidum. Dose, gr. xx–lx (1.30 to 4. Gr

Sodii Carbonas. (Used in making Aluminii Sulpl
Bismuthi Subnitras, Bismuthi Subcarbonas, Calcii Carbo
Pæcipitatus, Ferri Subcarbonas, Liquor Sodæ, Liquor Sc
Chloratæ, Massa Ferri Carbonatis, Pilulæ Ferri Cc
positæ, Potassii et Sodii Tartras, Sodii Carbonas Exsiccat
Sodii Phosphis, and Zinci Carbonas Præcipitatus.) (Wa
ing Soda) gr. v–xx (.30 to 1.30 Gm.).

Sodii Chloridum (table-salt). (Used in making Calor
and Corrosive Sublimate.) Dose, gr. x–ʒj (.65 to 4. Gn

Sodii Chloras. Dose, gr. ij–x (.13 to .65 Gm.).

Sodii Hypophosphis. Dose, gr. x–xx (.65 to 1
Gm.).

Syrupus Hypophosphitum (see page 211).

Sodii Hyposulphis. Dose, gr. x–xx (.65 to 1
Gm.).

Sodii Iodidum. Dose, gr. x–xl (.65 to 2.60 Gm.).

Sodii Nitras. Gr. xx–ʒij (1.30 to 8 Gm.).

Sodii Sulphas. *Glauber's Salt.* Dose, ℥ss–j (16.
32. Gm.). (Also used in making Sodii Carbonas.)

Sodii Bisulphis. Dose, gr. x–ʒss (0.65 to 2. Gm

Sodii Sulphis. Dose, gr. xx to ʒj (1.30 to 4 Gm.)

Sodii Arsenias. Dose, gr. $\frac{1}{12}$–$\frac{1}{3}$ (.005 to .02 Gm

Liquor Sodii Arseniatis. Dose, ♏ iij–v (.20 to .30 Gm

Sodii Bicarbonas. (Baking Soda.) Dose, gr. v-
(.30 to 4. Gm.).

Mistura Rhei et Sodæ. (See RHUBARB.)

Pulvis Effervescens Compositus. (See page 470.)

Trochisci Sodii Bicarbonatis (āā 3 grains).

Sodii Carbonas Exsiccatus. (Used in making Sodii Arsenias.) Dose, gr. ij–x (.13 to .65 Gm.).

Sodii Phosphas. Dose, as a cholagogue, gr. xx–xl, or as a purgative, ℥j–ij (1.30 to 64. Gm.). (Used in making Ferri Phosphas and Ferri Pyrophosphas.) Dose, gr. v–℥j (0.30 to 30. Gm.).

Liquor Sodæ Chloratæ. *Labarraque's Solution.* Dose, fʒss–j (2. to 4. Gm.), well diluted.

Sodii Pyrophosphas. Dose, gr. v–xl (0.30 to 2.60 Gm.).

Sodii Salicylas. Dose, gr. x–ʒj (.65 to 4 Gm.).

Sodii Santoninas. Dose, gr. ij–x (.13 to .65 Gm.).

Trochisci Sodii-Santoninatis (āā gr. j). Dose, 1 to 5.

Liquor Sodii Silicatis. (Soluble glass.) External use.

Sodii Sulphocarbolas. Dose, gr. ij–v (.13 to .32 Gm.).

POISONING.

Soda is a corrosive mineral poison, and its symptoms and morbid appearances are analogous to those following the use of potassa.

TESTS.

Caustic soda in solution is not precipitated by bichloride of platinum, or by tartaric acid; its alkaline nature can be ascertained by the usual tests. Antimoniate of potassium affords a white precipitate when added to the salts of soda. Soda tinges the outer flame of the blowpipe yellow.

ANTIDOTES.

The same as for potassa.]

EFFECTS AND USES.

The sodium salts have none of the depressing action on the heart which we have seen to be possessed by potash.

Locally, we may use soda in *acute eczema;* or the hyposulphite in parasitic skin disease, where it acts in virtue of the contained sulphurous acid; and the borate, or borax, as a gargle, as a lotion in *pruritus* and various skin diseases, and as an application to aphthous ulcerations about mouth.

A saturated solution of carbonate of sodium is said a very soothing application in burns. [It must be ap cold, and, therefore, is not well adapted to cases wh large area is injured, but it may be applied freely in th form of the bicarbonate.] The internal use of borax sionally causes an eruption of psoriasis curable by arsen

Soda is not so much used internally as a remedy for and rheumatism, because the urate of soda is less so than the urate of potash; but it is one of our best rem in those forms of *dyspepsia* with pain after food, weig the stomach, red fissured tongue, cough, and palpita The hyposulphite is useful in *sarcinous vomiting*, and physicians have faith in the hypophosphate as a ne tonic.

[The bicarbonate is a remedy of value in irritabili the bladder. It is also frequently used in combination syrup of rhubarb in *catarrhal jaundice*.]

Sodium chloride is a good emetic; the phosphate and trate are purgative, but none of the preparations appe be decidedly diuretic in their action. Sodium phos was found by Rutherford to be a powerful stimulant o liver, whilst sodium sulphate possessed the same actio a less degree.

Seidlitz Powder. (Pulvis Effervescens Co situs.)

℞. Potassii et sodii tart.	ʒij;	or	8	
Sodii bicarbonatis	gr. xl;	"	2	60
Misce, ut fiat haustus effervescens cum				
Acidi tartarici	gr. xxxv;	"	2	30
Aquæ	f℥iv;	"	128	
Statim sumendus.				

[To be kept in separate papers until just before u when each is to be dissolved in half a tumblerful of w the solutions are then mixed and drunk at once.

In cases of *obstinate vomiting* with constipation, br doses of Seidlitz powder given frequently are useful ¼ of each powder in an ounce of water, given, whilst effe cing, every fifteen minutes. *Impaction of feces* may oft overcome by frequent doses of these powders.]

℞. Sodii bicarbonatis	gr. xx;	or	1	30	Gm.
Tinct. calumbæ	♏xx;	"	1	30	"
Syrupi zingiberis	fʒss;	"	2		"
Infusi gentianæ compositi q. s. ad	f℥j;	"	32		"

Misce, ter die sumend.

Useful draught in dyspepsia.

[The following is a pleasant antacid combination, known as:—

Soda-Mint.

℞. Sodii bicarbonatis,					
Sacchari,	āā ʒij;	or	8		Gm.
Spiritus ammoniæ aromatici	♏xl;	"	2	60	"
Aquæ menthæ piperitæ q. s. ad	f℥viij;	"	256		"

M. S. Dose, a tablespoonful after meals.

Used in flatulent dyspepsia. It admits of the addition of tincture of nux vomica, or syrup of rhubarb.

Compressed pills of soda-mint, for making the solution extemporaneously, may also be obtained from druggists.]

[SPIGELIA—PINKROOT.

The rhizome and rootlets of Spigelia Marilandica, Linné (N. O. Loganiaceæ).

Dose, in substance, ʒj (4. Gm.).

OFFICINAL PREPARATION.

Extractum Spigeliæ Fluidum. Dose, fʒj–ij (4. to 8. Gm.).

Spigelia is an efficient remedy against the *round worms*, or *lumbricoids*, and in moderate doses is entirely safe; but in overdoses has narcotic properties. It is given in infusion or syrup, morning and evening, for two or three days, followed by a brisk cathartic. An objection to the use of spigelia is that it imparts its red color to the clothing. It is best given with a cathartic, as in the "Extractum Spigeliæ et Sennæ Fluidum," U. S. 1870, the proportions being f℥x of the former to f℥vj of the latter, with oil of anise and oil of caraway, each ♏xx. Dose, for a child two years old, fʒss–j (2 to 4 Gm.).]

[Spiritus.

List of Spirits officinal in the U. S. P. :—

Spiritus Ætheris
" " Compositus
" " Nitrosi
" Ammoniæ
" " Aromaticus
" Anisi
" Aurantii
" Camphoræ
" Chloroformi
" Cinnamomi
" Frumenti

Spiritus Gaultheriæ
" Juniperi
" " Compositus
" Lavandulæ
" Limonis
" Menthæ Piperitæ
" " Viridis
" Myrciæ
" Myristicæ
" Odoratus
" Vini Gallici.]

[SPIRITUS FRUMENTI—WHISKY.

An alcoholic liquid obtained by the distillation of fermented grain (usually corn, wheat, or rye), and at least two years old.]

[SPIRITUS VINI GALLICI—BRANDY.

An alcoholic liquid obtained by the distillation of fermented grapes, and at least four years old.

For effects and uses, see Alcohol.]

STAPHISAGRIA—STAPHISAGRIA (STAVES-ACRE).

[*The seed of Delphinium Staphisagria, Linné (N. O. Ranunculaceæ).*]

The ointment of stavesacre [crushed seeds one part, benzoinated lard two parts, P. Br.] is an effectual and unirritating cure for *scabies*.

[It is said to possess diuretic, cathartic, and emetic properties. In *prurigo*, it has been used externally with success. Its principal use is for destroying vermin.

The seeds contain several alkaloids, the most important being *delphinine* and *staphisagrine*, the first resembling aconite in its effects, the latter acting like curare; both cause death by asphyxia. Brunton.]

[STILLINGIA—STILLINGIA (QUEEN'S ROOT).

The root of Stillingia sylvatica, Linné (N. O. Euphorbiaceæ).

Dose, in substance, gr. xx (1.30 Gm.).

Officinal Preparation, U. S.

Extractum Stillingiæ Fluidum. Dose, ♏xx–xxx (.130 to 2. Gm.).

Stillingia is highly esteemed as an alterative in *secondary syphilis, skin disease*, and *scrofula*. In large doses it is emetic and cathartic. As an alterative, it is frequently given in combination with sarsaparilla. A decoction (℥j to Oiij boiled to Oj), dose, f℥j–ij (32. to 64. Gm.); and a tincture (℥ij to Oj), dose, fʒj (4. Gm.), are largely used in the South, but are not officinal.]

[STRAMONII FOLIA—STRAMONIUM LEAVES.

The leaves of Datura stramonium, Linné (N. O. Solanaceæ).

No Officinal Preparation.

STRAMONII SEMEN—STRAMONIUM SEED.

The seed of Datura stramonium, Linné (N. O. Solanaceæ).

Officinal Preparations, U. S.

Extractum Stramonii. Dose, gr. ¼–½ (.015 to .03 Gm.).

Unguentum Stramonii (extract 10 per cent). External use.

Extractum Stramonii Fluidum. Dose, ♏j–ij (.06 to .13 Gm.).

Tinctura Stramonii (10 per cent.). Dose, ♏x–xx (.65 to 1.30 Gm.).

Antidotes.

The same as for belladonna-poisoning. See page 195.]

After the careful description already given of the actions and uses of belladonna, it is unnecessary to say much about stramonium. Modern investigation has shown that the ac principle, daturine, is identical with atropine ; and the c marked difference between the two plants seems to con in the more decided antispasmodic properties of stramoni which cause it to be much prized as a remedy for *asth* In the purely spasmodic varieties of that disease, and m efficiently when inhaled in the form of smoke, it seldom f to give relief. [The ointment is used for *hæmorrhoids.*]

STRYCHNINA—STRYCHNINE.

An alkaloid prepared from Nux Vomica or Ignatia, and also occurrin other plants of the Nat. Ord. Loganiaceæ.

[See Nux Vomica.]

[STYRAX—STORAX.

A balsam prepared from the inner bark of Liquidambar orientalis, Miller (N. O. Hamamelaceæ, Balsamifluæ).

Tinctura Benzoini Composita. External use.

Storax has been recommended as a substitute for copai in the treatment of *gonorrhœa* and *gleet;* and mixed w olive oil, equal parts, is effectual in the treatment of *scabi* It is ranked as a stimulating expectorant, but is chiefly us as an ingredient in the compound tincture of benzoin.]

SULPHUR SUBLIMATUM—SUBLIMED SULPHU

S ; 32.

A fine citron yellow powder, slight odor, faintly acid taste, insoluble i water or alcohol.

(Flowers of Sulphur.) Dose, ʒj–iij (4 to 12 Gm.).

Officinal Preparations.

Sulphur Lotum. *Sublimed sulphur, thorough washed with water.* Dose, ʒj–ij (4 to 18 Gm.).

Pulvis Glycyrrhizæ Compositus. (See Senna

Unguentum Sulphuris (sublimed sulphur 30 part benzoinated lard 70 parts).

Sulphuris Iodidum. Not used internally.

Sulphur Præcipitatum. Precipitated sulphur. Dose, ʒj–iij (4 to 12 Gm.).

Unguentum Sulphuris Alkalinum (washed sulphur 20 parts, carbonate of potash 10 parts, water 5 parts, benzoinated lard 65 parts).

The officinal SULPHITES are:—

Sodii Hyposulphis.
Sodii Sulphis.
Sodii Bisulphis.
Potassii Sulphis.
Magnesii Sulphis.

Sublimed sulphur is used in making Emplastrum Ammoniaci cum Hydrargyro. (For sulphates see ACID SULPHURIC).

The officinal SULPHIDES are:

Calx Sulphurata (commonly misnamed Sulphide of Calcium, but of which it contains 36 per cent.). Antimonium Sulphuratum (which is chiefly Antimonious Sulphide with a very small amount of Antimonious Oxide). Antimonii Sulphidum, Antimonii Sulphidum Purificatum, and Potassa Sulphurata which contains at least 56 per cent. of true Sulphide of Potassium.]

EXTERNAL USE.

Sulphur is used externally as a stimulant in various forms of chronic skin disease, such as *acne faciei*, and more especially in *itch*, a disease dependent on the presence of a minute insect, the acarus scabiei, the male of which ranges freely over the skin, whilst the female retires with her eggs to oblique burrows in the cuticle. These receptacles having been broken up by soap and water, sulphur ointment is carefully spread over all the patient's body at bed-time, and washed away by a warm bath next morning. Two or three applications of this sort are sufficient to cure the disease, and if the patient's skin will bear the unguentum sulphuris, one smearing with this may be sufficient. The *rationale* of the treatment is, not that sulphur acts as a direct poison to the acarus, but that it forms with lard a very tenacious and adhesive substance, which suffocates the insect by blocking up its air-pores. [The sulphur ointment should generally be diluted with cerate, ½ to ¾; otherwise it may produce too great irritation.]

Sulphur is also in great favor as a popular remedy rheumatism, sprinkled on new flannel and applied to painful part, and there is no doubt that some benefi action may thus be caused. Lastly, sulphur makes a use bath in some forms of chronic skin disease.

INTERNAL USE.

Physiological Action.	*Therapeutical Action.*
1. It has been supposed to exert a stimulating influence on the mucous membranes and skin.	1. In virtue of this, it u to be occasionally prescri in *chronic bronchitis* a *phthisis*, and also used ternally in *skin diseases.* its action on the skin may attributed its undoubt power of aiding—more es cially in the form of bath the elimination of lead a mercury from the syste Sulphur has lately been commended as the best me of preventing mercurial s vation.
2. It causes slight increase of the peristaltic movements of the bowels.	2. It acts, therefore, as gentle laxative, slightly so ening the feces, and fr the mildness of the action is specially useful in *p* and all irritable conditi about the rectum. Its p gative action is increased its being dissolved and form into a sulphide by the alk of the bile.
3. Sulphur has well-marked antiseptic properties in consequence of its destructive power over the lower forms of vegetable life.	3. Burnt in a room w closed doors and windows, is the best way to remove germs of infection from air by fumigation.

Sulphur is given off from the system principally by bowels, but also by the milk, the sweat, and the skin, in form of sulphuretted hydrogen, and by the urine as a sulphate.

Strong applications of sulphur frequently irritate the skin, and bring on troublesome eczema. The disadvantage of sulphur as an aperient is the offensive odor which the sulphuretted hydrogen communicates to the feces.

The confection [Br.] is the best purgative form [containing sulphur ℥iv, and cream of tartar ℥j, in syrup of orange-peel f℥iv], in tea- or table-spoonful doses.

[The sulphites have been recommended by Polli in drachm doses for pyæmia and septicæmia, but more extended experience declares them to be worthless for this condition. The sulphite or the hyposulphite of soda is sometimes given in yeasty or sarcinous vomiting to prevent fermentation.]

[SUMBUL—SUMBUL.

The root of Ferula Sumbul, Hooker filius (N. O. Umbelliferæ, Orthospermæ).

Dose, gr. x–lx (.65 to 4. Gm.).

OFFICINAL PREPARATION.

Tinctura Sumbul (10 per cent.). Dose, ʒss–j (2 to 4 Gm.).

Musk-root contains a volatile odorous oil, angelicic and valerianic acids, some soft resin, etc. It may be used in chronic bronchitis, leucorrhœa, etc., in doses of gr. 8–60 (.05 to 4. Gm.). The tincture may be given in *hysteria.*]

Suppositoria.

For officinal formula for Suppositories, *see* under OLEUM THEOBROMÆ, page 388. There are no officinal Suppositories in the edition of the Pharmacopœia of 1880.]

[Syrupi.

The officinal Syrups are—

Syrupus Acaciæ
" Acidi Citrici
" " Hydriodici
" Allii
" Althææ
" Amygdalæ
" Aurantii
" " Florum
" Calcii Lactophosphatis
" Calcis
" Ferri Bromidi
" " Iodidi
" " Quininæ et Strychninæ Phosphatum
" Hypophosphitum
" " cum Ferro
" Ipecacuanhæ
Syrupus Krameriæ
" Lactucarii
" Limonis
" Picis Liquidæ
" Pruni Virginianæ
" Rhei
" " Aromaticus
" Rosæ Gallicæ
" Rubi
" " Idæi
" Sarsaparillæ Comp.
" Scillæ
" " Compositus
" Senegæ
" Sennæ
" Tolutanus
" Zingiberis.]

TABACUM—TOBACCO.

[*The commercial dried leaves of Nicotiana Tabacum, Linné (N. O. Solanaceæ).*

Officinal Preparations, U. S.

Infusum Tabaci (ʒj to Oj). Dose, f ʒij (8. Gm.).
Oleum Tabaci. Not used internally.
Unguentum Tabaci. (Watery extract of leaves ℥j to ℥xvj of lard.)
Vinum Tabaci. Dose, gtt. v–xx (.30 to 1.30 Gm.).

Antidotes.

Strychnine and diffusible stimulants may be regarded as physiological antidotes to tobacco; and after thoroughly washing out the stomach, tincture of digitalis may be exhibited to counteract the depressing influence of the poison on the heart, and the tendency to collapse. Respiration should be stimulated by ammonia, frictions, and even maintained artificially. Sulphate of strychnine may be given hypodermically, and stimulating enemata injected.]

EFFECTS AND USES.

Tobacco is now rarely, if ever, used internally in medicine, on account of its poisonous properties; but it is a substance in such general domestic use, and therefore of so great physiological interest, that we must devote some little space to considering the results of modern experiment on its action.

LOCAL ACTION.

Physiological.

Tobacco is readily absorbed by the skin, and symptoms of poisoning have followed the application of strong infusions to the unbroken cuticle.

Therapeutical.

Tobacco has been used as a local application in *prurigo* and other skin diseases, but is too readily absorbed to deserve recommendation for this purpose.

INTERNAL ACTION.

1. *Brain and Nervous System.*—The brain seems to be little affected, but some excitement of the spine is an early symptom of the poisonous action of the drug, speedily followed, however, by muscular relaxation and paralysis, also of spinal origin.

The sensory nerves are not affected, but we find lowering of the functional activity of the motor nerves. The pupil is contracted.

The use of tobacco is believed to have some injurious effect on vision; and Hutchinson and others have recorded instances of atrophy of the optic nerve and total blindness thus produced.

Amblyopia and color blind-

1. Before the introduction of chloroform, advantage was taken of the depressing and relaxing influence of tobacco on the muscular system to employ the enema in strangulated hernia and dislocations. Any occasional success, however, was amply counterbalanced by the inconveniences and even dangers which too often resulted; and this application of the drug has now fallen into well-merited oblivion.

In consequence of its lowering action on the reflex function of the spinal cord, it has been proposed as a remedy for *tetanus* and an antidote for *strychnine-poisoning*.

ness are not uncommon in smokers.

[It is claimed that these effects are more apt to follow from the combined action of tobacco and alcohol than from tobacco alone.]

2. *Circulation and Respiration.*—It is not necessary for us to go into the elaborate and contradictory series of experiments made to prove the fact that tobacco is a powerful depressant of the heart's action. The temperature usually falls in tobacco-poisoning, and death ensues from respiratory paralysis. [Excessive use of tobacco produces functional disorder of the heart, which may result in hypertrophy, dilatation, and organic disease.]

3. *Digestive and Secreting Organs.* — Tobacco usually causes nausea and vomiting, as most smokers can testify; but toleration is soon established, and even considerable doses then fail to disturb the equanimity of the digestive organs, save a slightly purgative action on the bowels. It is stated, however, that in habitual smokers some symptoms of dyspepsia may be detected, indicated by furred tongue and loss of appetite; and there is also some generally diffused, granular irritation about the pharynx.

2. Tobacco-smoking has been known to give relief in *asthma* and *chronic bronchitis.*

3. Moderate smoking, as a rule, aids digestion, by acting as an aperient. [The post-prandial cigar is thought to aid digestion by confirmed smokers, and tends to increase either the peristalsis or secretions of the intestine, or both. In *chronic constipation* Bartholow advises small doses of the wine of tobacco to be added to a laxative combination, given at night.]

[TAMARINDUS—TAMARIND.

The preserved pulp of the fruit of Tamarindus Indica, Linné (N. O. Leguminosæ, Cæsalpinieæ).

Tamarinds are laxative, and are used in making a refrigerant drink for the sick. They enter into the Confectio Sennæ, U. S. P.]

[TANACETUM—TANSY.

The leaves and tops of Tanacetum vulgare, Linné (N. O. Compositæ).

Tansy contains a bitter principle, tanacetin, and some volatile oil. It is carminative, and has been employed as an emmenagogue in doses of gr. j–iij (.06 to 20. Gm.). The oil is sometimes taken with the object of causing abortion, but in this it rarely succeeds, while it may cause violent intestinal irritation, ending in death.]

TARAXACUM—DANDELION.

[*The root of Taraxacum Dens-leonis, Desfontaines (N. O. Compositæ), gathered in autumn.*

OFFICINAL PREPARATIONS, U. S.

Extractum Taraxaci. Dose, gr. xx–xxx (1.30 to 2. Gm.).

Extractum Taraxaci Fluidum. Dose, fʒj–ij (4. to 8. Gm.).]

Taraxacum is usually prescribed as a matter of routine in sluggish liver, and the various forms of *dyspepsia* depending on a supposed deficiency of bile; but, although it may have some mild tonic, diuretic and aperient properties, there is not the slightest evidence for asserting that it exerts any real influence over the hepatic functions.

℞.	Succi taraxaci [Br.]	fʒj;	or	4		Gm.	
	Acidi nitro-muriatici dil.	♏x;	"		65	"	
	Tincturæ lupulinæ	♏xx;	"	1	30	"	
	Aquæ q. s. ad	f℥j;	"	32		"	M.
S.	Ter die sumend.						

TEREBINTHINA—TURPENTINE.

[*A concrete oleo-resin obtained from Pinus palustris, Michaux, and fi other species of Pinus (N. O. Coniferæ).*]

[TEREBINTHINA CANADENSIS—CANADA TURPENTINE (BALSAM OF FIR).

A liquid oleo-resin obtained from Abies balsamea, Marshall (N. O. Coniferæ).

Turpentine enters into Emplastrum Galbani, and Cana Turpentine into Charta Cantharidis, Emplastrum Ferri a Collodium Flexile.]

[OLEUM TEREBINTHINÆ—OIL OF TURPENTINE.

A volatile oil distilled from Turpentine.

Dose of oil of turpentine ♏x–xx (.65 to 1.30 Gm given 3 or 4 times daily, in typhoid fever, or chronic d entery; or f℥j to f℥ss (4. to 16. Gm.) as a vermifuge.

OFFICINAL PREPARATION, U. S.

Linimentum Terebinthinæ (Resin Cerate 65 par Oil of Turpentine 35). Used as a counter-irritant.

Turpentine enters into Linimentum Cantharidis.]

LOCAL ACTION.

Physiological.

Turpentine, when applied to the skin, causes redness, tingling, and irritation, leading on to acute inflammation and blistering, if not removed within a limited period.

Therapeutical.

This effect of turpenti causes it to be much used a counter-irritant in th cases where we wish to lieve congestion of inter organs by driving the bl to the surface. Thus, *peritonitis pneumonia, br chitis*, and *asthma*, it is f quently employed, eit sprinkled on hot flannel, or in the form of the Linimentum Terebinthinæ of the Pharmacopœia.

CONSTITUTIONAL ACTIONS.

Physiological.	*Therapeutical.*
1. *On the Brain.*—Turpentine produces, in large doses, giddiness, and other symptoms somewhat resembling alcoholic intoxication, and even ending in coma in rare instances.	1. [Turpentine is a valuable stimulant in low fevers, where the kidneys are not diseased.]
2. *Circulation.*—Turpentine acts at first as a stimulant to the heart, and has undoubted astringent properties, partly, no doubt, from its coagulating influence on the albumen of the tissues, but also by causing contraction of the smaller vessels.	2. As an astringent, turpentine is valuable in various forms of *hemorrhage*, but more especially in that from the *kidney* and in *purpura hemorrhagica* [but is now rarely used as a hæmostatic, oil of erigeron Canadense, ergot, and the mineral astringents being more reliable, and less irritating].
3. *Digestive and Secreting Organs.*—Turpentine is distinctly irritating to the alimentary canal, frequently causing vomiting and diarrhœa, and it has the property of checking mucous secretions from the various canals. It is also a very certain diuretic of the stimulating class, but must be used with caution, as it is apt to cause frequent and painful micturition with bloody urine, and eventful suppression of the secretion [strangury], and acute inflammation of the	3. Turpentine is a valuable astringent in some forms of *diarrhœa*, and more especially that which results from the later and ulcerative stage of *enteric* or *typhoid fever*. It is highly recommended in the same disease by some authorities when abdominal pain and distension coincide with a raw, clean, dry tongue, and in ordinary tympanites it makes a good addition to a purgative enema. It has been recommended by Dr. King Chambers as an enema in *sciatica*, where it is supposed

kidneys. It is therefore well to insist on any one using it internally to drink freely of barley water or other diluent fluids, and not to take a dose within three hours of going to bed.

to act locally on the affect nerve, which, at one part its course, lies directly contact with the large int tine; and it has long enjoy a well-deserved reputation an anthelmintic in cases *tape-worm.*

Turpentine has also be given in small doses to che the excessive secretion some forms of *bronchit* and it may also be of serv in *chronic cystitis, gleet* a *pyelitis.*

It has also been used w alleged success, though is difficult to see on wl principle, in *iritis,* and I Crocker praises it highly *psoriasis.*

MODE OF ELIMINATION.

Turpentine is rapidly absorbed into the blood, and quickly passes out, principally by the lungs and kidne imparting to the urine a peculiar violet odor.

[Old oil of turpentine is considered an efficient antid against phosphorus-poisoning.]

DOSE AND MODE OF ADMINISTRATION.

℞. Olei terebinthinæ	f℥j;	or	4	Gm.
Mucilaginis acaciæ	f℥v;	"	20	"
Misturæ amygdalæ, Aquæ laurocerasi [Br.],	āā f℥ss;	"	16	"
S. f℥j pro dosi quartis horis.				
℞. Olei terebinthinæ	♏x;	"	65	"
Mucilaginis	℥j;	"	32	"
Ter die sumendus post cibum.				

In *psoriasis.*

A few drops of the oil may be given on a lump of sug in hemorrhage. It is also very conveniently given in per or capsules.

As an anthelmintic, half an ounce may be prescribed [combined with an ounce of castor oil, and is very effective against *round worms* as well as *tæniæ*].

[THUJA—THUJA (ARBOR VITÆ).

The fresh tops of Thuja occidentalis, Linné (N. O. Coniferæ).

The Arbor Vitæ is balsamic; its principal constituent is a volatile oil. It contains *pinipicrin*, a bitter amorphous substance, which also exists in the leaves of Pinus Sylvestris, and a yellow substance, *thujin*. Externally, the fresh leaves have been used, rubbed up with lard, as an application to *indolent ulcers* and to *condylomata*. Internally, thuja has been given for *intermittent fever*, *rheumatism*, and *amenorrhœa*, also in *chronic catarrh* and *bronchorrhœa*.]

THYMOL—THYMOL.

[$C_{10}H_{13}HO$; 150.

Nearly colorless crystals, with thyme-like odor, pungent taste and neutral reaction. Soluble in 1200 parts of water, or one part of alcohol at 15° C. (or 59° F.) It liquefies with camphor. Sp. grav. 1.028 as a solid; when fused it is lighter than water. It should be quite free from carbolic acid.]

This is an excellent antiseptic, less powerful than carbolic acid, but ten times less poisonous, and much less irritating.

Prof. Volkmann has used it instead of carbolic acid in carrying out Prof. Lister's antiseptic plan, and recommends the following solution :—

℞. Thymolis	gr. xv;	or	1	Gm.	
Alcoholis	℥ijss;	"	10	"	
Glycerini	ʒv;	"	20	"	
Aquæ	Oij;	"	1000	"	M.

To be used as a spray.

It has also been found a good application in *eczema* and *psoriasis*, and *ringworm*.

[The glycerite of thymol diluted with water makes an excellent mouth-wash :—

℞. Thymolis	gr. xviij ;	or	1	2 Gm.	
Glycerini,					
Alcoholis,	āā ʒvijss ;	"	30	"	
Aquæ destillat.	℥xvij ;	"	540	"	M.]

[Tincturæ.

The officinal TINCTURES are—

Tinctura Aconiti
" Aloës
" " et Myrrhæ
" Arnicæ Florum
" " Radicis
" Asafœtidæ
" Aurantii Amari
" " Dulcis
" Belladonnæ
" Benzoini
" " Composita
" Bryoniæ
" Calendulæ
" Calumbæ
" Cannabis Indicæ
" Cantharidis
" Capsici
" Cardamomi
" " Composita
" Catechu Composita
" Chiratæ
" Cimicifugæ
" Cinchonæ
" " Composita
" Cinnamomi
" Colchici
" Conii
" Croci
" Cubebæ
" Digitalis
" Ferri Acetatis
" Ferri Chloridi
" Gallæ
" Gelsemii
" Gentianæ Composita
" Guaiaci
" " Ammoniata

Tinctura Humuli
" Hydrastis
" Hyoscyami
" Ignatiæ
" Iodi
" Ipecacuanhæ et Opii
" Kino
" Krameriæ
" Lavandulæ Compositæ
" Lobeliæ
" Matico
" Moschi
" Myrrhæ
" Nucis Vomicæ
" Opii
" " Camphorata
" " Deodorata
" Physostigmatis
" Pyrethri
" Quassiæ
" Rhei
" " Aromatica
" " Dulcis
" Sanguinariæ
" Saponis Viridis
" Scillæ
" Serpentariæ
" Stramonii
" Sumbul
" Tolutana
" Valerianæ
" " Ammoniata
" Vanillæ
" Veratri Viridis
" Zingiberis
Tincturæ Herbarum Recentium.]

TRAGACANTHA—TRAGACANTHA.

[*A gummy exudation from Astragalus Gummifer, Labillardière, and from other species of Astragalus (N. O. Leguminosæ, Papilionaceæ).*

OFFICINAL PREPARATION, U. S.

Mucilago Tragacanthæ (Tragacanth 6, glycerin 18, water q. s. ad 100), as a vehicle.

It is the basis of most of the officinal troches.]

Tragacanth is of service as a vehicle for the suspension and division of various powdered drugs.

[TRITICUM—TRITICUM (COUCH-GRASS).

The rhizome of Triticum repens, Linné (N. O. Gramineæ), gathered in the spring and deprived of its rootlets.

Extractum Tritici Fluidum. Dose, ʒj-iv (4 to 16 Gm.).

Couch-grass has some domestic reputation in pulmonary affections. It has some *diuretic* properties. It is devoid of starch or resinous matter, but contains about twenty-two per cent. of sugars. It is an innocent remedy, and may be given as a decoction *ad libitum* or in the form of fluid extract, which is a pleasant malt-like preparation.]

[Trochisci.

The officinal LOZENGES are :—

Trochisci Acidi Tannici
" Ammonii Chloridi
" Catechu
" Cretæ
" Cubebæ
" Ferri
" Glycyrrhizæ et Opii
" Ipecacuanhæ

Trochisci Krameriæ
" Magnesiæ
" Menthæ Piperitæ
" Morph. et Ipecacuanhæ
" Potassii Chloratis
" Sodii Bicarbonatis
" Sodii Santoninatis
" Zingiberis.]

ULMUS—ELM (SLIPPERY ELM).

[*The inner bark of Ulmus fulva, Michaux (N. O. Urticaceæ, Ulmeæ).*

OFFICINAL PREPARATION, U. S.

Mucilago Ulmi. Used externally, or as a vehicle.]

Elm bark is probably tonic and astringent, but is rarely if ever used [except as an emollient application in external inflammations, such as erysipelas].

[**Unguenta.**

The officinal OINTMENTS are—

Unguentum Acidi Carbolici
" " Gallici
" " Tannici
" Aquæ Rosæ
" Belladonnæ
" Chrysarobini
" Diachylon
" Gallæ
" Hydrargyri
" " Ammoniati
" " Nitratis
" " Oxidi Flavi
" " Rubri

Unguentum Iodi
" Iodoformi
" Mezerei
" Picis Liquidæ
" Plumbi Carbonatis
" " Iodidi
" Potassii Iodidi
" Stramonii
" Sulphuris
" " Alkalinum
" Veratrinæ
" Zinci Oxidi.]

[USTILAGO—USTILAGO (CORN SMUT).

Ustilago Maydis, Leveillé (N. O. Fungi), grown upon Zea Mays, Linné (N. O. Gramineæ). Ustilago should be preserved in a dry place and should not be kept longer than a year.

Ustilago or corn-ergot contains about five and a half per cent. of an amorphous substance resembling sclerotic acid; it also contains a fixed oil, and a volatile amine-like substance soluble in ether, which apparently is identical with trimethylamine. It is used as a substitute for ergot in stimulating the contractions of the uterus during labor. The fluid extract (not officinal) is used in about the same doses as ergot (♏xv–℥j = 1–4 Gm.).]

UVA URSI—UVA URSI (BEARBERRY).

[*The leaves of Arctostaphylos Uva Ursi, Sprengel (N. O. Ericaceæ).*

OFFICINAL PREPARATION, U. S.

Extractum Uvæ Ursi Fluidum. Dose, fʒss to j (2. to 4. Gm.).]

Uva ursi is astringent and possibly diuretic. [It is also tonic and antilithic, and is believed to favor uterine contraction.]

The astringency of this drug being principally directed to the genito-urinary mucous membrane, it is held by surgeons to be of some service in various chronic affections of these parts.

VALERIANA—VALERIAN.

[*The rhizome and rootlets of Valeriana officinalis, Linné (N. O. Valerianaceæ).*

Dose, in substance, gr. xxx to ʒjss (2. to 6. Gm.).

OFFICINAL PREPARATIONS, U. S.

Abstractum Valerianæ. Dose, gr. v–xxx (.30 to 2. Gm.).

Extractum Valerianæ Fluidum. Dose, fʒss to j (2. to 4. Gm.).

Oleum Valerianæ. Dose, gtt. ij–v (.13 to .30 Gm.).

Tinctura Valerianæ (20 per cent.). Dose, fʒj–ij (4. to 8. Gm.).

Tinctura Valerianæ Ammoniata (powdered valerian 20 parts, with aromatic spirits of ammonia to make 100 parts). Dose, fʒj–ij (4. to 8. Gm.).

The officinal VALERIANATES are:—

Ammonii Valerianas.
Ferri Valerianas.
Quininæ Valerianas.
Zinci Valerianas.

Dose, gr. j–ij (.06 to .12 Gm.).]

EFFECTS AND USES.

Various elaborate investigations have been made in Germany on the physiological actions of valerian, but they have not much bearing on its practical application, and the drug itself is hardly of sufficient importance to justify us in devoting much time to its consideration. We may therefore say, generally, that acceleration of the action of the heart, mental hallucinations, giddiness, and some digestive derangement are among the principal of the symptoms described most fully by Phillips.

The more important therapeutic applications of valerian have not stood the test of time and experience, and its use is now practically restricted to *hysteria* and the various nervous conditions depending thereon. [In *nervous headache*, the ammoniated tincture is a reliable resource.]

[The oil is supposed to be the active principle. It may be used with ether for inhalation, in *nervous headache*. The salts of valerianic acid are now generally used in the place of the preparations of valerian itself. These salts may be given in pill or in combination with simple elixir. The elixir of valerianate of ammonia is generally kept in the shops.]

[VANILLA—VANILLA.

The fruit of Vanilla planifolia, Andrews (N. O. Orchidaceæ).

Tinctura Vanillæ, the only officinal preparation, is used as a flavoring for articles of food for the sick. Vanilla also is used as a flavoring ingredient in Trochisci Ferri and Trochisci Potassii Chloratis.]

VERATRINA—VERATRINE.

[*An alkaloid or mixture of alkaloids, prepared from the seeds of Asagrea officinalis, Lindley (N. O. Melanthaceæ).*

OFFICINAL PREPARATIONS, U. S.

Oleatum Veratrinæ (2 per cent.). External use.
Unguentum Veratrinæ (4 per cent.). External use.

POISONING.

In directly fatal doses, veratrine depresses the whole nervous system; the respiration and circulation are gradually suspended; the convulsive movements, noticed under smaller doses, now pass into tetanus, the rigidity of the muscles of the chest impedes respiration, and death takes place by asphyxia (Dr. Stillé).[1]

ANTIDOTES.

Vegetable astringent infusions, containing tannic acid, should be freely administered, the stomach washed out, followed by stimulants and an opium suppository, or enema. Tincture of digitalis would seem to be a physiological antidote. Whisky may be given hypodermically on the approach of collapse.]

EXTERNAL ACTIONS.

Physiological.

The application of veratrine to the skin causes first pricking and tingling, followed by redness and acute darting pain. To this succeeds numbness, due, in all probability, to some local anæsthetic influence on the extremities of the sensory nerves.

The slightest contact of

Therapeutical.

Veratrine has been used with success as a local application in cases of *neuralgia* of the fifth nerve, but its irritating properties must always be a barrier to its extensive employment. [The officinal ointment generally requires dilution ½ to ¾. When used, care should be taken not to rub the eyes with the greasy veratrine with the nasal mucous membrane causes violent irritation and prolonged sneezing.

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[1] [National Dispensatory, Phila., 1879, p. 1478.]

fingers, as violent co
tival irritation may re

INTERNAL ACTIONS.

Physiological.

Brain and Nervous System. — No action on the brain.

Spinal Cord. — A good deal of elaborate, but unfortunately contradictory, experimental evidence has been adduced by various observers with reference to the effects of veratrine on voluntary movement. In the first place convulsions and even tetanic spasms may be produced by the administration of the drug, but these are speedily followed by paralysis and complete muscular prostration; and the balance of testimony goes to show that this is due to a primary exciting and secondary paralyzing action on the muscular structures themselves.

I. *Heart and Circulation.* —Veratrine first increases the action of the heart by stimulating its motor ganglia, but secondary slowing and depression rapidly ensue from an exciting action on the vagi.

Respiration is at first quickened, but subsequently retarded by the lowering effect of the drug on the respiratory centre. The temperature of the body falls.

Therapeutical.

I. Veratrine is neve
internally in this co
Trousseau advises its
pneumonia, and in go
rheumatism.

Digestive and Secreting Organs.—Veratrine often causes troublesome vomiting and purging, and the saliva and sweat are increased.

VERATRUM VIRIDE—VERATRUM VIRIDE (AMERICAN HELLEBORE).

[*The rhizome and rootlets of Veratrum viride, Aiton* (*N. O. Melanthaceæ*).

OFFICINAL PREPARATIONS, U. S.

Extractum Veratri Viridis Fluidum. Dose, gtt. j–iij (.06 to .20 Gm.).

Tinctura Veratri Viridis (50 per cent.). Dose, gtt. iij–viij (.20 to .50 Gm.).]

Some local action has been observed, of an irritant nature, somewhat resembling that of veratrine.

CONSTITUTIONAL ACTIONS.

Physiological.	*Therapeutical.*
I. *Brain and Nervous System.*—1. Green hellebore has no action on the brain.	
2. *Spinal Cord.*—A very decidedly depressing effect is exerted on the spine, indicated by extreme muscular prostration.	2. [It has been given in large doses in *puerperal eclampsia.*]
II. *Heart and Circulation.*—Veratrum viride is also a powerful vascular depressant, the pulse rate being lowered, and the arterial tension diminished; these effects being due both to a direct action of the drug on the heart muscle and to stimulation of the cardiac inhibitory nerves.	II. Veratrum viride has been extensively used in America on account of its depressing influence on the circulation, and it is stated that we may get good results by prescribing it in the early stages of *pneumonia* and other inflammatory conditions. Little or no English experience, however, has yet been brought to bear on the discussion of this question.

[It was formerly used in *typhoid fever* as an antipyretic. It only acts as an antiphlogistic when physiological symptoms are decidedly developed.]

III. No effect is produced on the respiration, but a distinct lowering of temperature has been observed.

IV. *Digestive and Secreting Organs.*—Veratrum viride has emetic properties, and frequently causes vomiting; and purging, also, not unfrequently follows its use.

[IV. The nauseating and depressing effects are best counteracted by opium and alcoholic stimulants.]

Two alkaloids exist in veratrum viride, JERVINE and VERATROIDINE, the main difference between which seems to be, that the latter is apparently responsible for the digestive disturbance which occasionally results.

[VIBURNUM—VIBURNUM (BLACK HAW).

The bark of Viburnum prunifolium, Linné (N. O. Caprifoliaceæ).

Extractum Viburni Fluidum. Dose, ʒss–j (2. to 4. Gm.).

Black-haw bark contains valerianic acid, resin, tannic acid and a bitter principle. It has some reputation for preventing threatened abortion, especially where there is a known tendency to this accident. It is also given for dysmenorrhœa. The fluid extract is a good preparation. Dose, ʒj–ij (4. to 8. Gm.).]

[Vina.

The officinal WINES are—

Vinum Album Fortius
" Alöes
" Antimonii
" Aromaticum
" Colchici Radicis
" " Seminis
" Ergotæ
Vinum Ferri Amarum
" " Citratis
" Ipecacuanhæ
" Opii
" Rhei
" Rubrum.]

[VIOLA TRICOLOR—VIOLA TRICOLOR (PANSY).

The wild-grown flowering herb of Viola tricolor, Linné (N. O. Violaceæ).

The syrup of viola is an agreeably fragrant syrup, but is not officinal. The crude drug is supposed to contain the emetic and cathartic principle, *violin*, found in viola odorata, and to possess some alterative virtues. It has been recommended in *eczema*, but is not of much therapeutic interest.]

[VITELLUS—YOLK OF EGG.

The yolk of the egg of Gallus Bankiva, var. Domesticus, Temminck (Class Aves, Order Gallinæ).

OFFICINAL PREPARATIONS, U. S.

Glyceritum Vitelli (Fresh yolk of egg 45, glycerin 55 parts). For external use.

Mistura Chloroformi (Purified chloroform 8, camphor 2, fresh yolk of egg 10, water 80 parts). Dose, ʒj–iv (4. to 16. Gm.).

The yolk of egg possesses high food value, as it consists principally of yellow oil; it also contains *lecithin*, which is a phosphorized fatty substance. It is a valuable addition to the diet of convalescents or consumptives.]

[XANTHOXYLUM—XANTHOXYLUM (PRICKLY ASH).

The bark of Xanthoxylum fraxineum, Willdenow, and of Xanthoxylum carolinianum, Lambert (N. O. Rutaceæ, Xanthoxyleæ).

Extractum Xanthoxyli Fluidum. Dose, ʒss–j (2 to 4 Gm.).

Prickly-ash bark contains a bitter principle, probably an alkaloid, tannic acid, resin, oil, etc. The fluid extract is a strong tincture, and is given in doses of 8 to 30 minims (.5 to 2. Gm.) in *flatulent colic, suppression of menses, chronic rheumatism, syphilis, liver disorders*, etc.]

ZINCUM—ZINC.

[*Metallic zinc, in the form of sheets or irregular granulated pieces.*

Officinal Preparations.

Zinci Oxidum. Dose, gr. ij–x (.12 to .65 Gm.).
  Unguentum Zinci Oxidi (20 per cent.). External us
Zinci Bromidum. Dose, gr. j–ij (.06 to .13 Gm.).
Zinci Chloridum. As a caustic and astringent.
  Liquor Zinci Chloridi (50 per cent.). (Burnett's Disi fecting Fluid.)
Zinci Acetas. Dose, gr. ½–ij (.03 to .13 Gm.).
Zinci Carbonas Præcipitatus. For external us
Zinci Iodidum. Dose, gr. ½–ij (.05 to .13 Gm.).
Zinci Phosphidum. Dose, gr. $\frac{1}{20}$–$\frac{1}{10}$ (.003 to .0(Gm.).
Zinci Sulphas (white vitriol). Dose, as an emeti gr. x–xxx (.65 to 2. Gm.).
Zinci Valerianas. Dose, gr. i–ij (.06 to .12 Gm.).

Antidotes.

The alkalies and alkaline carbonates are the chemic antidotes to the salts of zinc. Evacuation of the stomac and bowels should be followed by the exhibition of eggs an milk. The retching, colicky pains, and diarrhœa may b relieved by morphine hypodermically.]

Local Actions.

Physiological.

Chloride of zinc is an exceedingly powerful caustic, and, in weak solution, has astringent properties. The sulphate and oxide are also astringent in varying proportions. [Owing to its power of preventing the development of micro-organisms it has a place in the antiseptic treatment of wounds; and is

Therapeutical.

Chloride of zinc has bee used as a caustic for th treatment of cancerous an other ulcerations, either i strong solution, substance or arrow-shaped masses mad with flour, and inserted int incisions around the base o the morbid mass. It ha turned out to be the principa ingredient in all so-calle largely used in preserving cadavers for dissection.]

cancer-curer's nostrums, and is employed in legitimate surgery as an application to wounds from which *cancerous growths* have been removed, and also (in the strength of gr. lx and f℥j) to the raw surface after ordinary operations, with the view of preventing pyæmia.

Sulphate of zinc is a much-valued astringent lotion in *conjunctivitis*, and makes an excellent injection in *gonorrhœa*, *conjunctivitis*, and *leucorrhœa;* and the oxide, either in powder or ointment, is one of the most useful applications in chronic skin disease. The oleate of zinc forms an excellent application in acute eczema. [The acetate is used for the same purpose as the sulphate (gr. ¼ to ½ in rose-water ℥j).]

INTERNAL ACTIONS AND USES.

Physiological.

1. *Action on Nervous System.*—This is probably tonic in character, and some astringent properties may also be noted.

Therapeutical.

1. We can thus explain the benefit which sometimes results from the use of sulphate of zinc in *chorea.* We here begin with a grain and continue in gradually increasing doses up to 6 or 8 grains, tolerance being rapidly established, and the emetic action of the drug avoided. Oxide of zinc, in doses of from 1 to 5 grains, is an excellent remedy in the *night-sweats* of phthisis, and

2. *On Digestive System.* —Sulphate of zinc promptly and effectually empties the stomach, without causing much depression or nausea.

it is also a valuable aid
treatment in the *diarrhœa*
children.

2. It is therefore our m
reliable direct emetic, in
luable in cases of poisoni
in doses of from 20 to
grains.

℞. Zinci sulphatis gr. xxx; or 2 Gm.
Aquæ f℥viij; " 256 "
Fiat haustus emeticus statim sumendus.

℞. Zinci chloridi gr. j; or 06 Gm.
Aquæ rosæ f℥iv; " 128 "

A good injection in gonorrhœa.

℞. Zinci oxidi ʒij; or 8 Gm.
Glycerini fʒij; " 8 "
Liquor plumbi subacetatis fʒiss; " 6 "
Aquæ calcis q. s. ad f℥vj; " 152 "
Fiat lotio.

Useful in impetigo.

℞. Zinci valerianatis gr. xxiv; or 150 Gm.
Confectionis rosæ q. s.
Fiat massa in pilulas duodecim dividenda. Deauren
pilulæ.

Nervine tonic.

The permanganate and the sulphocarbolate of zinc m
good injections in *gonorrhœa.* [Dr. Waugh uses the s
phocarbolate in 2–3 grain doses in cases of *typhoid fever*
control diarrhœa.]

ZINGIBER—GINGER.

[*The rhizome of Zingiber officinale, Roscoe (N. O. Zingiberaceæ)*

Dose, in substance, gr. x–xv (.65 to 1. Gm.).

OFFICINAL PREPARATIONS, U. S.

Extractum Zingiberis Fluidum. Dose, ♏x–
(.65 to 1.30 Gm.).

Oleo-resina Zingiberis. Dose, ♏ss–ij (.03 to
Gm.).

Syrupus Zingiberis. Dose, ʒj–ij (4. to 8. Gm.).

Tinctura Zingiberis (20 per cent.). Dose, ♏x–lx (.65 to 4. Gm.).

Trochisci Zingiberis (each containing two grains of the tincture). Dose, 1 to 5.

Also enters into Acidum Sulphuricum Aromaticum, Pulvis Aromaticus, Pulvis Rhei Compositus, and Vinum Aloes.]

Ginger is an agreeable stimulant and carminative.

NON-OFFICINAL PREPARATIONS.

HAVING now completed the study of the various articles contained in the National Pharmacopœia, we shall proceed to give a brief *résumé* of the properties of the most useful among those drugs which have not yet received official sanction Among these will be found some very important remedies, in addition to plants of great physiological interest, whose active medicinal powers have not yet been fully tested in practical medicine, and whose investigation opens up a valuable field for clinical observation.

ANTIPYRIN has undoubted antipyretic properties, and has proved useful in the fever of phthisis in doses of 15 grains twice a day. We must prescribe it, however, with a certain amount of caution, as serious and even fatal collapse has followed its use, and as vomiting and a measly eruption are occasionally sequelæ. [It has proved useful in spasmodic affections in *whooping-cough* and *asthma*, in doses of 3 to 5 grains. It has a decided influence over sensory nerves, and controls *neuralgia* and *migraine* in a remarkable manner. In some cases *sea sickness* has been relieved by it.]

CASCA BARK is the bark of erythrophlœum guineense, generally called casca, cassa, or sassy bark.[1] This is the ordeal bark of Angola. If the victim vomits he is acquitted, if it causes purging he is put to death. In an examination into its physiological action by Brunton and Walter Pye, fifty-four experiments were tried on various animals, and it was found to uniformly cause vomiting, purging, weakness, and finally death during a convulsion.

The purgation is probably due to a local action, as it never follows subcutaneous injection. The intestinal secretion is not increased; respiration is accelerated from stimulation of pulmonary branches of vagus, and not from action on respiratory centre. On circulation a primary slowing is caused from stimulation of the vagi, as it ceases after section of these nerves; and secondarily quickening, by paralysis of the ends of the vagus in the heart, thus resembling the action of digitalis. The arterioles contract (either directly or) from nervous action, the blood-pressure rises, and secretion of urine is increased. Brunton believes that it will be found even a more effectual drug than digitalis.

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[1] See Phil. Trans. Royal Soc., vol. cvii. part 2, rev. ed., 1870.

Powdered casca is a sternutatory.

CONVALLARIA MAJALIS has been found to be a cardiac tonic and diuretic, acting usefully in failure of compensation in mitral stenosis and regurgitation. Dose, gr. v of the extract.

CURARE or **WOORARA** is the South American arrow-poison. Dose, gr. $\frac{1}{10}$ (.006 Gm.). This is a watery extract of several plants, prominent among which are two belonging to the species of *strychnos* and *cocculus* (probably *Strychnos Castelnæ*, Wed., and *Cocculus toxiferus*, Wed.), and a variety of pepper. It has the consistence of thick paste, becoming brittle on drying; is blackish-brown in color, and has a bitter taste. [It is probable that its composition varies in different localities.]

Physiological.	*Therapeutical.*
Curare is an irritant to denuded surfaces, causing pain and inflammation.	It is only applied to wounds for its constitutional influence.

CONSTITUTIONAL EFFECTS.

1. *Nervous System.*—The mind remains clear. The inferior extremities are first and chiefly affected. "It seems probable, however, that the primary operation of woorara is upon the terminations of the nerves, and not on their central origin" (Stillé).	1. In *epilepsy* and *chorea*, curare has been tried and found to be useless.

2. *Muscular System.*—When injected into the blood, or hypodermically, curare causes general muscular paralysis, first affecting the inferior extremities, but ultimately involving all the muscles, including those of respiration. A large dose causes death by paralysis of respiration and asphyxia, but the heart continues beating after the breathing ceases, and animals may be restored by artificial respiration.

It is apt to cause ptosis in man, and mydriasis and diplopia may occur.

3. *Upon Secretion.*—When taken by the mouth, curare is eliminated by the secretions nearly as rapidly as absorbed, so that it is almost innocuous in this way, simply acting as a diuretic and diaphoretic.

2. This agent has b employed in almost all fo of muscular spasm, but it i tetanus that it has achieve best results. It is cer that it reduces the musc contractions and saves patient from the consequ exhaustion. It is reporte have cured 13 out of 33 ca of *tetanus*, and deserves ther trial.

In hydrophobia it also erts a good effect by reliev the violence of the convulsi and reducing their frequen In three cases it has b thought to have cured patie afflicted with *rabies canin*

3. As it is believed tha any abrasion or ulcer exis the stomach the drug n exhibit its toxic effects, internal use is not conside advisable in any considera dose.

Curare is best exhibited hypodermically, in order to ins exactness of administration. A solution in distilled water (part in one hundred) is the most available form, but it sho be freshly prepared. Ten minims of this solution would the ordinary dose, to be carefully repeated until its char teristic effects on the muscular system are observed.

What has been termed the sulphate of curarine has be used in doses of one-tenth that of the extract.

Dichloride of Ethidene has lately been introduced an anæsthetic, and has been favorably reported on by Glasgow committee of the British Medical Association.

It seems to be intermediate in its effects between chlo form and ether, depressing the heart and causing sickness a less degree (and less capriciously) than the former vap Clover values it in minor cases, using it after the previ production of insensibility by nitrous oxide gas.

Duboisia. [The leaves of Duboisia Myoporoides.]—The actions of this drug strongly resemble those of atropine, as it causes throat dryness, dilatation of the pupil, cephalalgia, vertigo, and drowsiness, the pulse and respiration being quickened, and a reddish eruption sometimes appearing on the skin. It has been successfully given in the sweating of phthisis. [Dose of the extract gr. $\frac{1}{6}$ to $\frac{1}{4}$; of Duboisine Sulphas, gr. $\frac{1}{120}$ to $\frac{1}{60}$. It is also used as a mydriatic by oculists, its effects being more transitory than atropine.]

Ethyl Bromide has been used as an anæsthetic, two drachms being sufficient to cause insensibility. It acts quickly, the effect rapidly passes off, and it does not physiologically depress the heart or breathing, but several deaths have followed its administration, and its use, therefore, has been discontinued. [Where the chemically pure drug is used it has been found to answer the purpose of an anæsthetic, being safer than chloroform and more pleasant than ether.]

Ethylate of Sodium. This is enthusiastically praised by Richardson as an application to nævus, mother's marks, lupus, and nasal polypi. It should be painted on with a camel-hair brush, and the resulting pain, which is often severe, may be relieved by an alcoholic solution of opium.

Fuchsine in dose of gr. j in pill, diminishes the albumen in the urine, in chronic kidney disease.

Grindelia Robusta in the form of fluid extract has been highly praised as a remedy for asthma. The dose is ʒij of the fluid extract every quarter of an hour during the attack, followed by smaller doses during the interval.

Jequirity in fresh infusion has been a good deal used of late as an application to granular lids. It often causes, however, a good deal of irritation, which may become unmanageable and destructive; and we would counsel caution in its employment.

Muscarin (Agaricus Muscaria) causes perspiration, flushing, giddiness, and salivation, but in a less degree than jaborandi, and acts more on the bowels.

It slows the heart and causes dyspnœa from contraction of the pulmonary vessels. When given by the stomach contracts, but when topically applied widely dilates, the pu It is at present, however, only a physiological curiosity, an never used in medicine, its principal interest being the ve exact antagonism to atropine which it possesses.

[Murell recommends it in the *sweating of phthisis*, dose of five minims of a one per cent. solution of the wat extract.]

Nitrite of Sodium has been recommended in cases epilepsy and angina pectoris, and appears to have been oc sionally of service. But it possesses very active physiolo cal properties, and is apt to cause a variety of nervous sym toms, which are both uncomfortable and alarming, a which more than neutralize any advantages to be deriv from its use.

Osmic Acid seems to have some locally soothing effect cases of neuralgia and sciatica, from 3 to 5 minims of a o per cent. aqueous solution being injected deeply into t neighborhood of the affected nerve.

Paraldehyde [a modification of aldehyde, a clear, pu gent liquid] is a good hypnotic, acting quickly, safely, a well, causing no headache nor digestive disturbance, a exerting no depressing action on the heart. It is thus s viceable in cases where chloral is inadmissible. Dose, f℥s ij (4 to 8 Gm.), with syrup and a bitter tincture.

[Petroselinum—Parsley, is the root of Petroselin sativum. The neutral liquid active principle, Apiol, h attained some reputation in the treatment of *intermitten* and is also used in *neuralgia* and *dysmenorrhœa*. Its na seating taste requires it to be given in capsule (gr. $3\frac{9}{1}$ Dose, one to four.]

[Quebracho—Quebracho Bark is the bark of the tr Aspidosperma Quebracho (Schlechtendahl). A member the family of Apocyneæ, the aspidosperma quebracho is native of the northern part of South America, and is obtain from the province Catamarea,[1] of the Argentine Republ where it has long been popular as a febrifuge.

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[1] Primke, Pharm., Zeitung, No. 9, 1880.

In 1878, Schickendanz sent some of this bark to Europe, as a succedaneum for cinchona bark, where Dr. Penzoldt,[1] after testing its therapeutic effects, pronounced it a remedy of considerable power, and Fraude[2] isolated from it an alkaloid "aspidospermine," which is insoluble in glycerine, but dissolves in fats and oils; and produces the same physiological effects as the bark itself. Dose, as an antiperiodic, gr. xviij. (Guttman.)

The following pharmaceutical preparations have been made:—

Tinctura Quebracho (macerate in 5 parts alcohol, 50 per cent. for 8 days and filter).

Tinctura Quebracho Composita (bark 2, orange peel 1 part, alcohol 5 parts).

Vinum Quebracho (bark 1, 56 per cent. alcohol 2 parts, white wine 16 parts).

Elixir Quebracho.

Extractum Quebracho Fluidum. Dose, ♏xx–lx (1.30 to 4. Gm.).

Physiological Effects.	*Therapeutical Effects.*
Digestive Tract.—Taste bitter, astringent, and persistent or nauseating. Salivation has appeared both in dogs and man. Has some astringent effects upon the alimentary tract. When used for any length of time, disagreeable effects are often produced which forbid its continuance.	The tincture has been recommended for *diarrhœa* in phthisis; and in *chronic diarrhœa* in children.
Nervous System.—Motor paralysis of the limbs of central origin (Penzoldt). Paralysis of respiration, diminished frequency of heart's action (not due to inhibition). Death caused by general	In moderate doses may relieve restlessness of fevers, but has special value where the respirations are increased greatly above the normal. In attacks of *rapid breathing* during consumption, and in

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[1] G. Fraude, Berichte der Deutschen Chem. Gesellschäft, 1878.

[2] F. Penzoldt, Berlin Klinische-Wochenschrift, No. 19, 1879.

paralysis, dyspnœa, and convulsions (from apnœa?).

Respiration. — Breathing deepened and retarded by moderate doses.

Special Action. — Principally upon motor apparatus of respiration. No perceptible influence upon temperature, nor upon malarial manifestations.

cases of *palpitation* acco panying cardiac hypertrop quebracho has given mark relief.

It is used with great be fit in *emphysema, bronch catarrh, periodic asthma,* In asthma dependent up valvular insufficiency it less valuable than in *sp modic asthma* where it erts a special action.]

[Resorcin ($C_7H_8O_2$) is formed by fusing certain gu (galbanum, asafœtida, ammoniac, etc.) with potassi hydrate, the resulting mass dissolved in water super-saturat with sulphuric acid, subsequently filtering and agitating filtered solution with ether which dissolves out the resorc and from which it is subsequently obtained by evaporati and distilling; the resorcin sublimes and condenses in radiat crystals. (Wurtz.) The crystals are colorless and very luble in water, alcohol, and ether.

Resorcin is very destructive to infusoria and the l forms of organisms of fermentation and putrefaction; it more active even than carbolic acid. It may be appli locally to parasitic skin diseases, or suppurating woun without producing irritation.

Taken internally, in doses of gr. x–ʒj (.65 to 4. Gm it accelerates the pulse, stimulates the secretions, increasi the flow of the saliva and the activity of the sudoriparo glands; and secondarily depresses the temperature and t circulation. As an antipyretic the dose is from gr. xx ʒj (1.33 to 4. Gm.), and in this dose it has been used *hyperpyrexia* to meet the same indications as maximu doses of quinine, for which it may be substituted. It m also be administered hypodermically.]

Terebene [prepared by action of sulphuric acid on oil turpentine] is a good antiseptic and germicide [and expe torant. Dose, ♏ v–xv (.30 to 1. Gm.).]

Trimethylamine and its Hydrochlorate.—[Trimethylaminis hydrochloras. Dose, gr. iij–x (.20 to .65 Gm.). Propylamine is an impure trimethylamine.]

Lowering of temperature and pulse is said to follow the use of this drug, and it has been much recommended as a remedy for *acute rheumatism*. [Trimethylamine is irritating to the stomach, and should be given well diluted; peppermint water is the usual vehicle. On account of its depressing effect upon the heart and lungs, it may lead to fatal narcosis from retention of carbonic acid in the blood. The proper treatment of poisoning would be by opium and belladonna (morphine and atropine), and stimulants. Ammonia should not be used.]

Vaseline is a soothing and agreeable application in skin diseases. [Now officinal as Petrolatum, p. 404.]

Kaposi strongly recommends in *eczema* an ointment made by dissolving and thoroughly incorporating by heat equal parts of lead plaster and vaseline, adding a little oil of bergamot.

LEECHES.

[*Hirudo. Sanguisuga Officinalis.*]

Leeches are undoubtedly the most convenient means for the local abstraction of blood, and are used to relieve pain, which they do very effectually in certain local inflammations, as *pleurisy*, *pericarditis*, *orchitis*, *iritis*, *hepatitis*, *peritonitis*; and there is reason to believe that, when applied sufficiently early, they may even moderate the inflammatory process. Their action, no doubt, may frequently be explained by direct vascular communication between superficial vessels and those of deeper parts.

Each leech may contain about 1½ dr. of blood, and subsequent fomentation may draw so much more from the skin as to raise the total amount up to half an ounce. Should the subsequent bleeding prove difficult of arrest, as sometimes happens, we may succeed in staunching the flow by means of pressure, cold, various astringents, the application of solid nitrate of silver, or the twisted suture. [The American only takes about one-third as much blood as the imported leech, and, on this account, is preferred by some in the trea ment of diseases of children.]

Special cautions in the use of leeches are—never to appl them, if possible, to any part over which firm pressure ca not subsequently be made, as the larynx ; not to apply the in the evening, when, for some unexplained reason, th bleeding is more apt to be troublesome ; and, of cours never to allow their use in any victim of the hemorrhagi diathesis.

If leeches will not bite, we must smear the skin wit cream or freshly-drawn blood, or immerse the animal itsel in porter, which seems to have a stimulating effect ; an should one be accidentally swallowed we can kill it, an cause its expulsion from the stomach, by common salt.

QUESTIONS.

In submitting a series of questions to the consideration o the student, I have endeavored to place various suggestiv points before him in interrogative form, and to approach th border line between practical medicine and therapeutics by introducing a few short illustrative cases. The principl seems to me worthy of further development, and a systematic collection of typical cases, with variations and exceptions and bedside gleanings, might lead the way profitably up to those diffuse collections of symptoms which are occasionally rolled into concrete form by our examining boards.

It would not be difficult to expand my collection of queries to an almost unlimited extent ; but the conscientious attempt to answer those already constructed will at all events encourage the young reader to think for himself, and to emancipate his mind and memory from the enervating trammels of the more grinding forms of manuals.

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1. A child is under treatment for whooping-cough, and the mother states that after each dose of his medicine his face flushes and he complains of his throat being very dry. What drug is most likely to produce these symptoms?

2. Mention the different remedies to be employed in the various stages of syphilis.

3. A case of acute eczema presents itself for treatment ;

there is much moist exudation, with smarting and tingling and almost erysipelatous redness. It is proposed to give arsenic. Would this meet with your approval, and what would be your line of practice?

4. A patient comes to you in great alarm, thinking that he is paralyzed, his legs feeling weak and heavy, and his gait becoming staggering. At the same time you observe a few pimples of acne on his forehead, and you learn that he has lately been suffering from sleeplessness. To what would your suspicions point as the cause of his symptoms?

5. Give directions for disinfecting a room which has been occupied by scarlatinous patients.

6. Mention a drug which seems to have a specific influence over the poison of erysipelas, and write a prescription, with full directions for its use.

7. Write a prescription for an effervescing draught containing carbonate of ammonium.

8. Point out the error in the following prescription:—

℞. Tinct. hyoscyami ʒss; liq. potassæ ♏xx; mucilaginis ʒj; gentianæ infusi ℥j. Ter die.

9. You are called to a very severe case of delirium tremens. It seems advisable to give opium, and chloral has already failed. What course, therefore, would you pursue?

10. Mention the antidotes for prussic acid, strychnine, arsenic, and opium, with the general line of treatment to be pursued in a case of poisoning by each of these substances.

11. You are called to the following case. A middle-aged man has been known to suffer from heart disease, and on applying your ear to his chest you hear a well-marked mitral regurgitant bruit. His face is pale, with a tendency to lividity, his feet are beginning to swell, his pulse is weak and irregular, and does not accurately correspond to the beat of the heart, many of whose pulsations are not transmitted to the wrist. There are great anxiety and breathlessness, and ordinary stimulants have given only temporary relief. State your line of practice in such a case, and more especially the drug from which you would expect to derive speedy benefit.

12. Mention the various drugs which have been of service in tetanus, with your opinion of their relative efficiency, and give the dose of each.

13. Explain the action of the principal anæsthetic agents, and state what you consider to be most worthy of confidence.

14. Mention the remedies which act on the pupil, and

divide them into those which act locally and constitutionally. Are there any drugs which act differently on the pupil when taken internally and locally applied?

15. What is the disadvantage of the following prescription?

℞. Tincturæ opii ♏x; acidi sulphurici diluti ♏xx; decocti hæmatoxyli ℥j. Ter die sumend.

16. Write a soothing cough medicine for a case of phthisis, and include chlorate of potassium and morphine. Dose, one teaspoonful.

17. State the general treatment of a case of chorea, with the principal drugs which have been found useful, and give your opinion of their respective merits.

18. What are the indications by which we know that conium, arsenic and strychnine are beginning to produce their physiological effects?

19. Mention those drugs which are most readily absorbed through the unbroken cuticle.

20. Enumerate the principal cholagogue cathartics.

21. State the principal differences between the action of opium and morphine.

22. You are called to see a case of severe sprained ankle, and hear that a friend is about to apply tincture of arnica. On inquiry you find that this remedy has never been used to this patient before. Would you sanction the treatment?

23. Enumerate those drugs which stimulate, and those which depress, the action of the heart.

24. State which drugs are most worthy of confidence in cases of neuralgia of the fifth nerve.

25. A patient presents himself with the following symptoms: Constipation and violent colicky pain in the belly, some loss of power in the extensor muscles of the arms, a bluish line along the margin of the gums, anæmia. What is the cause of, and the proper treatment for, his complaint; and what prophylactic means would you recommend him to adopt?

26. Mention the various means of lowering the bodily temperature in health and disease, and explain their action, more especially enumerating those remedies which act only in conditions of pyrexia.

27. You have been attending a case of rheumatic fever, and all has gone well until you are told one morning that the patient has had a disturbed night, has been restless and

delirious, but that, at the same time, the pain in the joints has subsided. You find him looking dull, confused, and only partially conscious. The temperature registers 105°, and in another hour has gone up to 106°. What treatment would you advise?

28. State the principal dangers to be anticipated in chloroform administration, with their appropriate remedies.

29. Mention the unpleasant effects which sometimes follow the use of quinine.

30. What do you mean by "accumulation" in therapeutics?

31. A young married woman comes to ask relief for troublesome sickness and vomiting, recurring at intervals throughout the day, but always worse on first rising in the morning. What would you advise in the way of treatment, and how can you explain her symptoms?

32. Write a prescription for an alkaline lotion in a case of acute eczema.

33. Mention the best narcotics to be used under the following circumstances:—

1. Sleeplessness from overwork or worry.
2. Delirium tremens.
3. The fierce delirium of typhus.
4. Acute mania.

34. Write a prescription for iron in combination with potassium iodide and a vegetable bitter.

35. Mention the various drugs which produce eruptions on the skin, and describe the forms of eruption produced.

36. Mention the drugs which impart a peculiar color to the urine, with the varieties of tint produced.

37. Contrast the paralyzing effects of conium, Calabar bean, and veratrine.

38. State the physiological phenomena which may follow comparatively small doses of quinine, potassium iodide, potassium bromide, chloral, and mercury.

39. State what you mean by a "refrigerant."

40. You are called to see a patient in an advanced stage of phthisis, in whom the night sweats are causing serious exhaustion. All astringent remedies having failed, what drug would you recommend to be employed, and in what doses?

41. A patient is seized with acute tonsillitis, and it is of great importance that he should recover his voice in a short

time. Mention a drug which you might prescribe with go
hopes of speedy benefit.

42. An elderly man is attacked with acute bronchitis, t
cough and dyspnœa being urgent, and the sputa brought
with difficulty. The blood is beginning to be imperfect
aerated, the skin looking dusky and the lips blue, a
although he is occasionally drowsy by day, he can obtain
sleep in the night from the constant and irritating coug
His family are much distressed at this insomnia, and havi
persuaded the doctor to give him something to make hi
sleep, a full dose of opium is ordered. State the proba
result of this line of practice.

43. You are summoned to see a case of ague. The patie
cannot take bark or quinine in any form. What drug wou
you recommend in their place?

44. A case of diarrhœa presents itself, characterized
furred tongue, cramping pains in the abdomen, sickness, a
tenesmus, with the expulsion of rather scanty but thin a
frequent evacuation. It is proposed to arrest this by mea
of astringents. State whether this treatment would m
with your approval, and what your own plan would be.

45. You are called to a bad case of hæmoptysis. All
usual astringents and styptics have failed. What drug wou
you recommend, and how would you administer it?

46. State the best remedies for noctural incontinen
of urine.

APPENDIX.

(ADDED BY THE AMERICAN EDITOR.)

POISONS.

A poison is a substance of animal, vegetable, or mineral nature, which, when administered in small quantity, is capable of producing deleterious effects upon the human system. It may be introduced into the economy in a gaseous, liquid, or solid form, through any of the channels of absorption, though more commonly by the gastro-intestinal tract.

GENERAL ANTIDOTE FOR POISONING WHEN THE NATURE OF POISON IS UNKNOWN.

R. Magnesiæ,
Pulv. carbo. ligni,
Ferri oxidi rubri, āā ʒj. M.
To be given freely in a sufficient quantity of water.

Or, as suggested by Jeannel :—

Calcined magnesia . .	℥ij.
Washed animal charcoal .	℥j.
Water	℥xx.

To be kept well covered; when exhibited to be mixed with—

Solution of ferrous sulphate (sp. gr. 1.45) ℥ijss, and well agitated.

Given in doses of ʒjss–iij in poisoning by arsenic, zinc, the alkaloids, etc.[1]

This preparation is harmless, but is effective, for its ingredients are antidotes to the most common and active poisons. With it may be given demulcent drinks, such as milk or flour and water, to dilute the poison and protect the stomach.

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[1] The Practitioner's Reference Book, R. J. Dunglison, Phila., 1877, p. 228.

Prompt Treatment Table of Poisons.

Arranged alphabetically for ready reference.

Acetic Acid.—The alkaline carbonates, chalk, or magnesia. Vo iting should be encouraged, and demulcent drinks freely give

Aconite.—Active emetics, or stomach-pump. Stimulation ext nally and internally. Digitalis is a physiological antidote ; al finely powdered animal charcoal, or tannin, and astringent inf sions. Ammonia inhalations.

Alcohol.—Stomach-pump ; cold affusion ; inhalation of vapor hypodermic injection of ammonia ; use of electricity ; digitalis

Alum, and Sulphate of Aluminium and Potassium.—Warm dilu drinks to produce emesis ; hydrate of magnesia, or weak soluti of carbonate of ammonia ; stomach-pump.

Ammonia.—Vegetable acids, as dilute vinegar or lemon-juic olive oil ; milk given copiously ; stomach-pump should not used.

Amylene.—Same treatment as for chloroform poisoning.

Antimony and its Salts.—Tannin, as in tincture or infusion of ci chona, infusion of black tea, or of galls. Free vomiting wi warm mucilaginous drinks, or stomach-pump. Opium and i ternal and external stimulation may be employed subsequentl

Arsenious Acid.—Hydrated sesquioxide of iron to be given in moist state in tablespoonful doses, followed by castor oil. (T hydrate may be extemporaneously prepared by adding aqua a moniæ to dilute tinctura ferri chloridi.) Solution of dialyzed ir and freshly precipitated hydrate of magnesia have also been e ployed. These are not reliable if the arsenic has been taken form of powder. In the absence of vomiting, prompt emesis b sulphate of zinc or warm mustard and water. Warm demu cent drinks. Also ferrum oxidum hydratum cum magnesia.

Barium, Salts of.—Sodium or magnesium sulphate ; emetics a stomach-pump.

Belladonna.—No reliable chemical antidote ; tannin and anim charcoal have been employed. Physiological antidote, morphin which may be administered subcutaneously. Usual treatme for narcotic posions.

Bismuth Subnitrate.—Albumen, milk, sugar, mucilaginous drink

Brucia.—Same treatment as for poisoning by nux vomica.

Calabar Bean.—Physiological antidote, atropine cautiously a ministered hypodermically.

Camphor.—Emetics, stimulants, wine, and opium.

Cantharides.—Free emesis to be encouraged with warm demulce drinks ; castor oil ; demulcent injections.

Carbolic Acid.—Saturated solution of saccharate of lime has bee recommended, or Syrupus Calcis. Early use of the stomac pump. Olive oil, flour and water, etc. Epsom salt and the sol ble sulphates.

Carbonic Acid Gas.—Artificial respiration, friction, stimulant fresh air, and electricity.

Chloral.—Stomach-pump; stomach well washed out with tea or coffee. Diffusible stimulants. General treatment same as for opium poisoning, or poisoning by chloroform. Keep patient warm.

Chloroform.—In poisoning by liquid chloroform, use the stomach-pump and emetics. If collapse occur during anæsthesia, reverse the patient, practice artificial respiration. Ammonia by inhalation, ice in rectum, hypodermic injections of brandy and ammonia, etc.

Chromium, Compounds of.—Magnesium carbonate or chalk, in milk, albumen, or water, followed by emetics.

Citric Acid.—Alkaline carbonates, chalk, or magnesia.

Cocculus Indicus.—Mucilaginous drinks, stimulants, and emetics.

Colchicum.—Prompt emesis, castor oil, demulcents, opium and stimulants.

Conium.—Mustard and warm water. Active stimulation, externally and internally. Atropine hypodermically.

Copper, Preparations of.—Antidote, white of eggs, freely administered, or milk. Vomiting should be aided by warm mucilaginous drinks; stomach-pump if necessary.

Corrosive Sublimate.—Albumen, mixed with water and given copiously, forms insoluble compound; white of one egg neutralizes four grains of corrosive sublimate. Gluten, or wheat-flour paste, or milk, also employed. Free vomiting aided by warm diluent drinks; stomach-pump to be used with caution—may produce perforation.

Creasote.—Emetics or stomach-pump; demulcent and mucilaginous drinks.

Croton Oil.—Same general treatment as for other irritant poisons, to counteract excessive vomiting and purging. Opium stimulants, demulcents.

Curare.—Same general treatment as that mentioned for poisoning by narcotics; artificial respiration, hot coffee, etc.

Cyanide of Potassium.—See Hydrocyanic Acid.

Digitalis.—Vegetable infusions containing tannic acid render the active principle insoluble. Give emetics and hot applications to surface.

Ether, Vapor of.—Cold affusion; exposure to current of air; artificial respiration.

Gold, Preparations of.—Sulphate of iron; mucilaginous drinks.

Hydrochloric Acid.—See Muriatic Acid.

Hydrocyanic Acid.—Mixture of protosulphate and sequisulphide of iron (ferrous and ferric sulphate), followed by solution of potassium carbonate. Being rapidly fatal, treatment must be instantaneous. Cold affusion; cautious inhalation of ammonia and chlorine vapors; stimulation externally and internally.

Hyoscyamus.—Same general treatment as for poisoning by belladonna and vegetable narcotics.

Iodine.—Starch or flour, in water.

Iron, Chloride and Sulphate.—Magnesia, copious diluent drinks.

Lead Salts.—Zinc sulphate, producing free emesis, and forming insoluble lead sulphate. Milk and white of egg, given copiously, form insoluble compounds. Solutions of magnesium or sodium sulphate, freely administered, act as antidotes and cathartics; castor oil may also be administered.

Lobelia.—Emetics, purgatives, stimulants.

Methylene, Bichloride of.—Same treatment as for poisoning by chloroform vapor.

Morphine.—See Opium.

Muriatic or Hydrochloric Acid.—Solution of alkaline carbonates in water or milk; magnesia or chalk suspended in milk; soapsuds; scrapings from whitewashed walls (in the absence of other articles); free use of barley water, oily emulsions, gruel and milk in large quantities.

Nitrate of Potassium.—See Potassium.

Nitric Acid and Nitromuriatic Acid.—Same treatment as already detailed for poisoning by muriatic acid. Dilute solution of sodium carbonate, or fluid magnesia, with water, and milk or demulcents may be given.

Nitrous Oxide.—Same general treatment as for poisoning by chloroform vapor.

Nux Vomica.—See Strychnine.

Oil of Bitter Almonds.—Same treatment as for hydrocyanic-acid poisoning.

Opium and its Preparations.—Antidotes, tannic acid and iodated iodide of potassium. Physiological antidote, solution of atropine or tincture of belladonna. Treatment, direct emetics, as large doses of zinc sulphate, repeated if necessary, or mustard and warm water, or stomach-pump. For the narcotic effect of the drug, affusion with cold water, walking the patient, arousing him by shaking and shouting; flagellations; enemata of strong coffee. If unsuccessful, electricity and artificial respiration.

Oxalic Acid.—Avoid the use of alkalies or their carbonates, as they form poisonous salts with the oxalic acid. Give chalk or calcined magnesia, or its carbonate, suspended in water or milk, which forms insoluble and inert earthy oxalates; or saccharated solution of lime. After treatment, mucilaginous drinks, lime-water, and oil; warmth and stimulants.

Phosphorus.—Free vomiting; albuminous and mucilaginous drinks in which hydrate of magnesia is suspended. Oil, being a solvent of phosphorus, should be avoided. Old oil of turpentine (containing oxygen), oxygenated water, oxygen inhalations, copper sulphate, animal charcoal, have been employed as antidotes.

Physostigma.—See Calabar Bean.

Potassa.—Mild vegetable acids, as dilute vinegar or lemon juice; demulcent drinks; olive oil, in large quantities, produces a soap. Milk may be copiously administered. Stomach-pump should not be used.

Potassium Bitartrate (cream of tartar).—Same treatment as for the nitrate. Dilute solution of potassium bicarbonate reduces bitartrate to harmless neutral tartrate.

Potassium Cyanide.—Weak solution of ferrous sulphate converts it into Prussian blue; otherwise, treatment similar to that for hydrocyanic acid.

Potassium Nitrate.—No direct antidote; stomach pump; free vomiting, and copious mucilaginous drinks; stimulants, opium, and coffee, if great depression exists.

Prussic Acid.—See Hydrocyanic Acid.

Silver, the Salts of.—Albumen, milk. If nitrate, give the chloride of sodium, followed by emetics.

Soda, and its Preparations.—Same treatment as for potassa poisoning.

Stramonium.—Same treatment as for poisoning by belladonna. Morphine should be administered hypodermically.

Strychnine.—Bromide of potassium in very large doses. Hydrate of chloral, nitrite of amyl, and atropine have also been recommended. Prompt emesis by stomach-pump, or mustard and warm water, or mixture of ipecacuanha and zinc sulphate. Inhalation of chloroform, continuously employed, may relieve tetanic rigidity.

Sulphate of Indigo.—Calcined magnesia and milk, or fluid magnesia.

Sulphuric Acid.—Same treatment as for poisoning by muriatic acid. Solution of sodium carbonate in milk and water. Stomach-pump must not be used.

Tartaric Acid.—Same treatment as for poisoning by citric acid or oxalic acid.

Tartar Emetic.—See Antimony.

Tobacco.—Stomach-pump or emetics; whisky, strychnine, stimulating injections *per anum*, containing turpentine, or ammonia.

Veratrum.—Rapid emesis, stimulants, with laudanum, or some other opiate. Tannin has been proposed as an antidote.

Zinc Chloride.—Albumen given liberally. Free emesis, copious warm mucilaginous drinks, or stomach-pump.

Zinc Sulphate.—Tepid water, with milk and albumen; infusions containing tannic acid. Stomach-pump. Laudanum and starch emetics.

There are a number of so-called *vegetable irritants*, such as aloes, scammony, and jalap, which may give rise to toxical symptoms. Their effects should be treated on general principles, such as the employment of emetics, diluents, castor oil, opium, and fomentations. The same remarks apply also to the various articles of diet, such as meat, fish, lobsters, or fruits which occasionally produce similar results. *Irritant gases*, as chlorine, nitrous acid, or sulphurous acid vapor, etc., may act as poisons, and their effect should be treated by removal of the patient from the causes, cold affusion, and by antidotes as directed. The numerous poisonous *fungi* which may be taken into the stomach may also produce symptoms, and require treatment on general principles.

Bites of venomous reptiles require special treatment; the wound may be sucked with impunity, provided there be n abrasion upon the lips or tongue. The limb above the poi having a ligature placed around it, or compressed, the pa involved may be excised or cauterized with the hot iron c nitric acid. In snake-bite a strong solution of permanganat of potassium should be injected with a hypodermic syring into each puncture made by the fangs of the serpent. Th intravenous injection of ammonia has also been advise Stimulants, as ammonia or brandy, should also be freel given. The local treatment here detailed would also b applicable to *bites of rabid animals.*

The following Table, from Taylor "On Poisons," gives comprehensive review of the most approved antidotes for th several principal poisons noticed in the foregoing page which should be committed to memory :—

NON-METALLIC POISONS.

	Poisons.	*Antidotes.*
Mineral Acids.	Sulphuric Nitric Hydrochloric Nitro-hydrochloric	Magnesia mixed with water c milk; calcium carbonate compound chalk powder soda; potassa; the fixed oil
Vegetable Acids and their Alkaline Salts.	Oxalic Tartaric	Calcium carbonate (chalk c whiting).
	Potassium Binoxalate Potassium Bitartrate	Calcium carbonate. Calciu sulphate and water. Sodium carbonate in solutio
Alkalies.	Potassa, soda, ammonia, and their carbonates	Vinegar, lemon-juice, citri acid, or oil.

METALLIC POISONS.

Arsenic and soluble arsenites.	Hydrated peroxide of iron; hydrated magnesia; solution c dialyzed iron. Mixture of oil and lime-water.
Corrosive sublimate, and salts of mercury.	Albumen, gluten, or flour, diffuse in water or milk.
Phosphorus.	Cupric sulphate; old oil of turpentine; water containing magnesia.
Baryta and its soluble salts.	Sodium, potassium, magnesium or calcium sulphate.
Barium carbonate.	Mixture of magnesium sulphat and vinegar.

Poisons.	*Antidotes.*
Alum.	Sodium or ammonium carbonate.
Soluble salts of lead.	The alkaline, or soluble earthy sulphates.
Lead carbonate.	Magnesium sulphate and vinegar.
Soluble salts of copper.	Albumen, gluten, flour diffused in water; milk.
Tartar emetic.	Decoctions and tinctures containing tannic acid. Magnesia.
Antimony chloride.	Sodium carbonate; magnesia.
Salts of tin.	Milk; sodium carbonate; magnesia.
Zinc sulphate, or acetate.	Milk; sodium carbonate; magnesia.
Ferrous sulphate.	Sodium or ammonium carbonate.
Silver nitrate.	Sodium chloride, and emetics.

NARCOTIC POISONS.

Opium; hyoscyamus.	Emetics; stomach-pump, cold affusion. Strong decoction of coffee; electro-magnetism; tannic acid.
Prussic acid.	Ammonia; chlorine; cold affusion; iron and potassium carbonate (see p. 117); or cupric sulphate (1 Gm. followed by 0.5 Gm., every five minutes until vomiting is produced).

MODES OF DISTINGUISHING SOME OF THE VEGETABLE ALKALOIDS WHEN IN POWDER.

Treat the powder with nitric acid; this is colored red by *Brucine*, *Delphinine*, *Morphine*, and by the *Strychnine* of commerce, but not the pure. If the reddened acid become violet on the addition of protochloride of tin, it is *Brucine;* if it become black and carbonaceous, it is *Delphinine.* If the powder be fusible without decomposition, and decompose iodic acid, it is *Morphine;* if it be not fusible without decomposition, and do not decompose iodic acid, it is *Strychnine.* If the powder strike a green with nitric acid, it is *Solanine;* if insoluble in ether, and do not redden nitric acid, it is *Emetine;* if insoluble in ether, and do not redden nitric acid, but should melt and volatilize with heat, it is *Atropine;* if thus affected by ether or nitric acid, but do not volatilize, it is *Veratrine.* (Griffith.)

[PTOMAÏNES. During decomposition of the human body substances are formed called *Ptomaïnes*, which give reactions very much like some of the above alkaloids. Their existence should put the examiner on his guard. Gautier declares that they may occur in the living body, and he has extracted a poison resembling that of serpents' from human saliva, and from the urine he has also obtained the so-called cadaveric alkaloids. Ptomaïnes are distinguished from the alkaloids veratrine, morphine, and codeine with difficulty, but a plan has been devised by Brouardel and Boutmy (Comptes Rendus, 92, p. 1056; Annales d'Hygiène, v. p. 497), by which this is accomplished by potassium ferricyanide and silver bromide as re-agents: "If a base be present, indicated by the formation of a precipitate with potassium iodo-mercurate, and this instantly change potassium ferricyanide into ferrocyanide, giving a precipitate of Prussian blue on the addition of ferric-chloride, a ptomaïne is present; whereas precipitation by the iodo-mercurate, coupled with the non-reduction of the ferricyanide to the ferrocyanide, shows that a vegetable alkaloid is being dealt with. Morphine and veratrine, of the vegetable alkaloids, are exceptions to the above reaction." This may be supplemented by the silver test. If a piece of photographic paper imbued with the bromide of silver be written upon with a quill pen dipped in a solution of the base, and the paper be placed in a dark room, and then washed successively with sodium hypo-sulphite and water, the characters traced upon the paper will be made manifest by reduction which has occurred, if a ptomaïne be present." (Lond. Med. Record, vol. ix. p. 451.)]

EPITOME OF THE NATIONAL FORMULARY

ISSUED BY THE

COMMITTEE OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.[1]

ELIXIRIA—ELIXIRS. N. F.

(*In prescribing the physician should place N. F. after the name of the preparation in order to avoid substitution.*)

The value of pleasant vehicles to mask or modify the taste of bitter and nauseous drugs is recognized by every prescriber. The following kinds of the National Formulary have been carefully selected, and embrace the most effective combinations of adjuvants and aromatics for disguising the different drugs for which they are recommended:—

SIMPLE ELIXIRS.

Elixir Aromaticum (Aromatic Elixir).

An improved form of the original Simple Elixir, being a delicious compound of the choicest fruit flavors, Orange, Lemon, Coriander, and Star-anise. It contains about 25 per cent. of Alcohol, and is especially valuable as a simple vehicle or diluent of tinctures and preparations not particularly unpalatable. Being also prepared free from tannin it is the best vehicle for Tincture Chloride of Iron and all preparations of Iron.

The following are similar to the above, and may be useful where a change in the flavor is desirable:—

Elixir Anisi (Aniseed Cordial).

A combination of Anethol, Fennel and Bitter Almond.

Elixir Curassao (Curaçao Cordial).

A combination of Curaçao, Orris, a little Citric Acid and 25 per cent. of Alcohol.

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[1] From "The Physician's Manual of the National Formulary," compiled by C. S. Hallberg, Ph.G., with additions.

ADJUVANT ELIXIRS.

The following are intended as vehicles for Quinine and simila bitter substances, and as adjuvants for Tinctures and Fluid Ex tracts of bitter and resinous drugs, such as Cinchona, Cascar Sagrada, etc. They all contain Glycyrrhiza, which, in the form directed in the N. F. (Russian Licorice Root, peeled), is mos effective in masking the bitter taste of Quinine, etc., when directe to be simply suspended in the mixture without the use of acid fo effecting solution. Acids precipitate the glycyrrhizin and destro its power of masking the bitter taste:—

ELIXIR ADJUVANS.
A combination of Orange, Wild Cherry, Glycyrrhiza, Cori ander, and Caraway.
Except for the exhibition of Quinine this is the most effective of the adjuvant Elixirs.

ELIXIR GLYCYRRHIZÆ (Elixir of Licorice).
A solution of Licorice in Aromatic Elixir, the most effective vehicle for Quinine.

ELIXIR GLYCYRRHIZÆ AROMATICUM.
Elixir of Licorice, with the addition of strong aromatics.

ELIXIR TARAXACI COMPOSITUM.
An improved form of this well-known compound, useful as a mild adjuvant and laxative.

ELIXIR ERIODICTYI AROMATICUM (Arom. Elixir Yerba Santa —Elixir Corrigens).
A solution of Yerba Santa in Comp. Elixir of Taraxacum, intended as a vehicle for Quinine and other bitter remedies.

MEDICINAL ELIXIRS.

These comprise the Elixirs mostly in use; also, a number of preparations in which the prescriber will find satisfactory substitutes, designated by scientific titles and of definite strength and uniform composition, intended to replace various nostrums. The figures appended indicate the number of grains of active drugs in 1 fluidrachm.

ELIXIR—

ACIDI SALICYLICI	grs. 5
AMMONII BROMIDI	grs. 5
AMMONII VALERIANATIS. The odor and taste of the salt being well covered by the addition of vanilla and a little chloroform	grs. 2
AMMONII VALERIANATIS ET QUININÆ. The above, with Quinine hydrochlorate	gr. ¼

ELIXIR—

APII GRAVEOLENTIS COMPOSITUM (Celery Compound).

A combination to replace a patent medicine containing fluid extracts of Celery, Erythroxylon, Kola and Viburnum, each . . . . . grs. 4

BISMUTHI.

Citrate of Bismuth and Ammonium . . . grs. 2

BUCHU . . . . grs. 7½

BUCHU COMPOSITUM.

Buchu, Cubeb, Juniper and Uva Ursi, combined . . . . grs. 15

BUCHU ET POTASSII ACETATIS.

Elixir Buchu, with Acetate of Potassium . grs. 5

CAFFEINÆ.

Caffeine (in solution in Hydrobromic Acid) . gr. 1

CALCII BROMIDI . . . . grs. 5

CALCII HYPOPHOSPHITIS . . . . . . grs. 2

CALCII LACTOPHOSPHATIS.

Lactate of Calcium (in Phosphoric Acid) . gr. 1

CATHARTICUM COMPOSITUM.

One fluidrachm contains Senna 7½ grains, Podophyllum 4 grains, Leptandra and Jalap each 3 grains, 7½ grains Rochelle Salts and 1 gr. Bicarbonate of Sodium. The mixture should be shaken when dispensed. Average dose for an adult is f℥ij (8. Gm.).

CHLOROFORMI COMPOSITUM.

A mixture of equal parts of Chloroform, Tincture of Opium, Spirit of Camphor, Aromatic Spirit of Ammonia and Alcohol, flavored with Cinnamon. The old title, "Chloroform Paregoric," is recommended to be abandoned for the above. Each fluidrachm represents 1 grain Opium and 11 minims Chloroform.

CINCHONÆ (Elixir Calisaya). (See note.)

This preparation is from the best Calisaya Bark, containing about 6 per cent. of alkaloids, 4 of which are Quinine. It is preferable to preparations made from Quinine and the cheaper alkaloids in being a more agreeable and effective antiperiodic tonic. *(Each fluidrachm represents 14 grains of Yellow Cinchona.)*

This Elixir is used in all the Compound Elixirs of Cinchona, being more than double the strength prescribed by the N. F.

ELIXIR—

CINCHONA DETANNATUM (same as above, without Tannin Acid, so that it can be prescribed with Iron).		
CINCHONÆ ET HYPOPHOSPHITUM, (as above, with)		
Hypophosphites of Calcium and Sodium, each	gr.	1
CINCHONÆ ET FERRI (Calisaya and Iron—Ferrated Elixir of Calisaya).		
Phosphate Iron	grs.	2
CINCHONÆ, FERRI, BISMUTHI ET STRYCHNINÆ.		
Phosphate of Iron	grs.	2
Citrate of Bismuth and Ammonium	gr.	1
Strychnine sulphate	gr.	
CINCHONÆ, FERRI ET BISMUTHI.		
Phosphate of Iron	grs.	2
Citrate of Bismuth and Ammonium	gr.	1
CINCHONÆ, FERRI ET CALCII LACTOPHOSPHATIS.		
Phosphate of Iron	grs.	2
Lactophosphate of Calcium, about	gr.	
CINCHONÆ, FERRI ET PEPSINI.		
Phosphate of Iron	grs.	1
Pepsin, N. F. (1.500)	gr.	1
CINCHONÆ, FERRI ET STRYCHNINÆ.		
Phosphate of Iron	grs.	2
Sulphate of Strychnine	gr.	$\frac{1}{16}$
CINCHONÆ, PEPSINI ET STRYCHNINÆ.		
Containing smaller quantities of the Cinchona Alkaloids, Pepsin N. F., and Sulphate of Strychnine	gr.	$\frac{1}{16}$
CORYDALIS COMPOSITUM.		
Containing of Corydalis, Stillingia, Iris and Xanthoxylum, combined	grs.	15
Potassium Iodide	grs.	3
ERYTHROXYLI (Coca).		
Leaves, Erythroxylon Coca	grs.	7½
ERYTHROXYLI ET GUARANÆ.		
Erythroxylon and Guarana, of each	grs.	7½
EUCALYPTI.		
Leaves, Eucalyptus Globulus	grs.	7½
EUONYMI (Wahoo).		
Bark of root, Euonymus Atropurpureus	grs.	9½
FERRI HYPOPHOSPHITIS.		
Hypophosphite of Iron (ferric)	gr.	1
FERRI LACTATIS	gr.	1

ELIXIR—	
FERRI PHOSPHATIS.	
Phosphate of Iron (U. S. P.)	grs. 2
FERRI PHOSPHATIS, CINCHONIDINÆ ET STRYCHNINÆ.	
Phosphate of Iron 2 grains, Cinchonidine 1 grain, Sulphate of Strychnine	gr. $\frac{1}{100}$
FERRI PHOSPHATIS, QUININÆ ET STRYCHNINÆ.	
Phosphate Iron, 2 grains; Quinine Hydrochlorate	gr. 1
Sulphate of Strychnine	gr. $\frac{1}{100}$
FERRI PYROPHOSPHATIS	grs. 2
FERRI, QUININÆ ET STRYCHNINÆ.	
Ferric Chloride, Quinine Sulphate, of each	gr. 1
Sulphate of Strychnine	gr. $\frac{1}{100}$
FRANGULÆ (Buckthorn).	
Bark, Rhamnus Frangula	grs. 15
GENTIANÆ	grs. 2
GENTIANÆ ET FERRI PHOSPHATIS (Ferrophosphated Elixir of Gentian).	
Phosphate of Iron	gr. 1
Gentian	grs. 2
GENTIANÆ CUM TINCTURA FERRI CHLORIDI.	
Tincture Citro-chloride of Iron, 5 minims, equivalent to ⅔ grains ferric chloride. Gentian	grs. 2
GRINDELIÆ.	
Grindelia Robusta	grs. 4
GUARANÆ.	
Paullinia Sorbilis	grs. 11
HUMULI	grs. 7½
HYPOPHOSPHITUM.	
Hypophosphite of Calcium	grs. 3
Hypophosphites of Sodium and Potassium, each	gr. 1
HYPOPHOSPHITUM CUM FERRO.	
Hypophosphites of Calcium and Sodium, each	gr. 1
Hypophosphites of Potassium and Iron, each	gr. ½
LITHII BROMIDI	grs. 5
LITHII CITRATIS	grs. 5
LITHII SALICYLATIS	grs. 5
MALTI ET FERRI.	
Phosphate of Iron, 1 grain, and Malt Extract	grs. 15
PEPSINI.	
Pepsin, N. F. (1 to 500)	gr. 1

Elixir—

Pepsini et Bismuthi.	
Pepsin, 1 grain; Citrate of Bismuth and Ammonium	grs. 2
Pepsini, Bismuthi et Strychninæ.	
Elixir Pepsin and Bismuth and Strychnine	gr. $\frac{1}{10}$
Pepsini et Ferri.	
Elixir of Pepsin and Tincture Citro-chloride of Iron, equal to Ferric chloride	gr. ½
Phosphori.	
Phosphorus, in glycerin, alcohol and elixir	gr. $\frac{1}{5}$
Phosphori et Nucis Vomicæ.	
Elixir Phosphorus, with Tincture Nux Vomica	grs. 2
Picis Compositum.	
A combination of Syrup of Prunus Virginia, and of Tolu, with Methylic Alcohol with Sulphate of Morphine	gr. $\frac{1}{5}$
Pilocarpi (*Jaborandi*).	
Leaves, Pilocarpus pennatifolius	grs. 3¾
Potassii Acetatis	grs. 5
Potassii Acetatis et Juniperi.	
Acetate of Potassium, 5 grains; Juniper	grs. 7½
Potassii Bromidi.	
Bromide of Potassium, effectually masked in Adjuvant Elixir	grs. 10
Quininæ Compositum.	
Sulphate of Quinine, ⅛ grain; Cinchonidine and Cinchonine, each	gr. $\frac{1}{1}$
Chiefly intended as a substitute for Elixir Cinchona when the administration of other constituents of the bark may not be desirable.	
Quininæ et Phosphatum Compositum.	
Quinine sulphate, ¼ grain; Phosphate of Iron, 1 grain; and Lactophosphate of Calcium	gr. ¾
Quininæ Valerianatis et Strychninæ.	
Valerianate of Quinine	gr. 1
Sulphate of Strychnine	gr. $\frac{1}{100}$
Rhamni Purshianæ (Cascara Sagrada).	
Bark, Rhamnus Purshiana, its bitterness effectually masked with Elixirs Glycyrrhiza and Taraxacum Compound	grs. 15
Rhamni Purshianæ Compositum (Laxative Elixir—Elixir Purgans).	
Cascara Sagrada, 7½ grains; Senna and Juglans, each, 5 grains. Associated with aromatics and correctives. Adult dose, one to two fluidrachms.	

ELIXIR—	
RHEI.	
Sweet Tincture of Rhubarb, representing Rhubarb	grs. 2¼
RHEI ET MAGNESII ACETATIS.	
Acetate of Magnesium, 4 grains; Rhubarb	grs. 7½
RUBI COMPOSITUM (Blackberry Compound).[1]	
Blackberry Root, Galls and Cinnamon (Saigon), in equal proportions (.10). Combined with smaller quantities of Cloves, Mace and Ginger, in Blackberry Juice and Syrup.	
SODII BROMIDI.	
Bromide of Sodium, nicely masked in Adjuvant Elixir	grs. 10
SODII HYPOPHOSPHITIS	grs. 2
SODII SALICYLATIS	grs. 5
To be freshly prepared when required for use.	
STILLINGIÆ COMPOSITUM.	
Compound Fluid Extract of Stillingia, N. F.	grs. 15
STRYCHNINÆ VALERIANATIS	gr. $\frac{1}{100}$
TURNERA (Damiana).	
Leaves, Turnera Aphrodisiaca	grs. 9½
VIBURNI OPULI COMPOSITUM (Compound Elixir of Cramp bark).	
Viburnum Opulus, Aletris Farinosa, each	grs. 5
Trillium (Beth Root)	grs. 10
VIBURNI PRUNIFOLII (Black Haw)	grs. 7½
ZINCI VALERIANATIS.	
Valerianate of Zinc	gr. 1

EMULSIONES—EMULSIONS. N. F.

Emulsions should, of all pharmaceuticals, be prepared within a reasonable period previous to the time of dispensing. A true emulsion should contain the oil simply suspended in the form of a mechanical mixture, which, from its very character, cannot withstand the effects of variation in temperature any better than a *natural* emulsion, such as milk or emulsions of Almonds, Gum-Resins, etc., and consequently quickly degenerates or spoils.

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[1] CORDIALE RUBI FRUCTUS (Blackberry Cordial) contains fresh blackberry juice (3 parts) with a tincture made of dilute alcohol of Cinnamon, Cloves and Nutmeg (2 parts), and simple syrup (3 parts).

An emulsion may be perfect, that is, the oil globules entirel extinguished, yet a separation similar to that occurring in Mil will take place, which, though in its first stage not so objection able, will eventually impair the medicinal value of the prepara tion. These reasons are, it is believed, sufficient to condemn th various "ready-made" or patent emulsions, and to justify th physician in prescribing such as are kept on hand by the pharma cist, in smaller quantities, prepared according to these formulas.

The Emulsifying Agents directed in the N. F. are, in orde of preference, Irish Moss, Acacia, Glyconin (Glycerite of Eg Yolk), Tincture of Quillaia and Dextrin Mucilage. The firs three are mostly employed, the last two but seldom.

The Cod Liver Oil Emulsions of the N. F. are prepared wit Irish Moss unless otherwise specified.

The following are flavors employed: (1) Gaultheria, (2) gaul theria and sassafras, (3) aromatic spirit, (4) gaultheria, bitte almond and coriander, (5) gaultheria, sassafras and bitter almond (6) gaultheria and bitter almond, (7) oil of neroli, bitter almon and cloves. Unless otherwise specified that designated in No. will be employed in these Emulsions.

The following is a typical formula for an emulsion prepare with Irish Moss:—

EMULSIO OLEI MORRHUÆ, N. F.

℞.	Olei Morrhuæ	℥iv.
	Mucilaginis Chondri (N. F.) . .	℥iiss.
	Syrupi Tolutanæ	℥j.
	Aquæ . . . . q. s. ad	℥viij.

The Oil is emulsified by adding it to the mucilage, contained in a bottle, in divided portions, shaking after each addition, then adding the syrup, water and any desired flavoring.

A typical formula for emulsions, with Acacia, is:—

℞.	Olei Morrhuæ . . .	℥iv.
	Acaciæ pulv. . . .	℥vj.
	Syrupi Tolutanæ . .	℥j.
	Aquæ . . q. s. ad	℥viij.

Emulsify by trituration in a mortar, and add the flavoring.

These formulas may be useful as indicating the form of prescription for any combination desired. Hypophosphite Salts or any medication desired may usually be dissolved in the water directed in the formula should a different preparation be indicated from any of the following Emulsions of the N. F.:

EMULSIO—

OLEI MORRHUÆ CUM CALCII ET SODII PHOSPHATIBUS.
Phosphate of Calcium, Phosphate of Sodium, of each 1 grain, in 1 fluidrachm.

Emulsio—

Olei Morrhuæ cum Calcii Lactophosphate.
Lactophosphate of Calcium, 3 grains in one fluidrachm.

Olei Morrhuæ cum Calcii Phosphate.
Phosphate of Calcium. 2 grains in one fluidrachm.

Olei Morrhuæ cum Hypophosphite.
The Hypophosphite Salt, or any combination, of the following: Calcium, Potassium, Sodium or Iron, to be directed by the prescriber, 8 grains to the fluid ounce.

Olei Morrhuæ cum Pruno Virginiana.
Wild Cherry (Fluid Ext.), ½ fluidrachm to one fluid ounce.

Olei Morrhuæ cum Extracto Malti.
Contains 40 per cent. Extract of Malt.

Phosphatica (Phosphatic Emulsion).
Prepared with Glycerite of Egg Yolk, and contains in one fluid ounce: Cod Liver Oil, 2 fluidrachms; Dilute Phosphoric Acid, 22½ minims; Jamaica Rum, flavored with Bitter Almond and Orange Flower Water.

Olei Terebinthinæ.
Containing 1 fluidrachm Oil of Turpentine to the fluid ounce, prepared according to the following formula:

℞.	Olei Terebinthinæ	ʒiv.
	Acaciæ, pulv.	gr. xxx.
	Vitelli Ovi (Egg Yolk)	no. 1.
	Elixir Aromaticæ, N. F.	ʒiv.
	Aquæ Cinnamomi	q. s. ad ℥iv.

Make an Emulsion by trituration in a mortar.

Olei Ricini.
One fluid ounce contains 2½ fluidrachms Castor Oil, disguised by the addition of Vanilla.

Chloroformi.
One fluidrachm contains of Chloroform 2½ minims. Not a permanent emulsion, but a mixture, which requires shaking before use; prepared by agitating the chloroform with three-fourths its volume of Tincture Quillaia, N. F., and adding powdered Acacia, then water.

EMULSIONS OF VOLATILE OILS.

The N. F. gives the following general formula:—

Any Volatile Oil	fl. drs. 4.
Acacia, powdered	grs. 120.
Syrup	fl. oz. 1.
Water	enough to make fl. oz. 4.

Make an emulsion by agitating the oil with the acacia in a dry bottle, adding the syrup, and finally incorporate the water b agitation.

To render an Emulsion of a Volatile Oil more permanent th N. F. recommends the addition of one-half as much of a blan fixed oil (Almond) as of the quantity of volatile oil prescribed This makes a very satisfactory Emulsion.

AQUÆ—WATERS. N. F.

Aqua Chloroformi.

A solution of ⅝ per cent. of Purified Chloroform in Distille Water. (3 minims to the fluid ounce.)

Chloroform Water, aside from its medicinal properties, is a efficient preservative agent, and forms a good solvent in plac of water for preparing solutions intended to be kept free from micro-organisms, as, for example, those for hypodermic use.

Aqua Hamamelidis (Witch Hazel Extract).

Obtained by distilling the fresh young twigs of Hamameli with water containing 15 per cent. of Alcohol.

Aqua Sedativa (Eau Sedatif de Raspail).

A mixture of Spirits of Camphor (♏90), and Sodium Chloride (℥j), in Water containing about 1 per cent. Ammonia. (One pint.)

EXTRACTA FLUIDA—FLUID EXTRACTS. N. F.

The following Fluid Extracts represent, in addition to those officinal, most of the drugs employed in this form. Carefully prepared after the processes given in the N. F., from the best quality of crude drug, they represent uniformly the respective drugs, minim for grain.

Unless otherwise indicated the dose of the following Fluid Extracts is from one-half to one fluidrachm.

Extractum Fluidum—

Adonidis.—Root of Adonis vernalis L. (Bird's Eye).

Aletridis.—Rhizome of Aletris farinosa L. (Stargrass).

Angelicæ Radicis.—Root of Archangelica L. (Angelica).

Apii Graveolentis.—Seed of Apium graveolens L. (Celery).

Apocyni Cannabini.—Root of Apocynum cannabinum L. (Canadian Hemp).

Araliæ Racemosæ.—Root of Aralia racemosa L. (American Spikenard).

EXTRACTUM FLUIDUM—

ARNICÆ FLORUM.—Flowerheads of Arnica montana L. (Arnica).

ASCLEPIADIS TUBEROSÆ.—Root of Asclepias tuberosa L. (Pleurisy Root).

ASPIDOSPERMATIS.—Bark of Aspidosperma Quebracho, Sch. (Quebracho).

BERBERIDIS VULGARIS.—Bark of the root of Berberis vulgaris L. (Barberry).

BOLDI.—Leaves of Peumus Boldus, Molino (Boldo).

BUCHU COMPOSITUM.—A combination of Buchu, 10; Cubeb, 1; Juniper, 2; Uva Ursi, 2 ounces, in one pint.

CALENDULÆ.—Flowering herb of Calendula officinalis L. (Marigold).

CAMELLIÆ.—Leaves of Camellia Thea, Link (Tea). The best quality of commercial black tea, "Formosa Oolong," to be employed for this preparation.

CAULOPHYLLI.—Rhizome and rootlets of Caulophyllum thalictroides Mich. (Blue Cohosh).

COFFEÆ VIRIDIS.—Unroasted Seeds of Coffea Arabica L.

COFFEÆ TOSTÆ.—Roasted Seeds of Coffea Arabica L.

The N. F. recommends equal portions of Java and Mocha to be employed in preparing the fluid Extracts of Coffee.

CONVALLARIÆ FLORUM.—Flowers of Convallaria majalis L. (Lily of the Valley). *Dose*, from 10 to 20 min.

CONVALLARIÆ RADICIS.—Rhizome of Convallaria majalis L. (Lily of the Valley). *Dose*, from 10 to 20 min.

COPTIS.—Rhizome of Coptis trifolia, Salisb. (Goldthread).

CORNUS CIRCINATÆ.—Bark of Cornus circinata, L'Her. (Green Osier).

CORYDALIS.—Tubers of Dicentra Canadensis, De C. (Turkey Corn).

COTO.—Coto bark. Undetermined tree. *Dose*, from 5 to 15 min.

ERIODICTYI.—Leaves of Eriodictyon Californicum, Benth. (Mountain Balm; Yerba Santa).

FUCI.—Thallus of Fucus vesiculosus L. (Bladder-wrack).

HELIANTHEMI.—Herb of Helianthemum Canadense, Mich. (Frost-wort).

HUMULI.—Strobiles of Humulus Lupulus L. (Hops).

HYDRANGEA.—Root of Hydrangea arborescens L. (Seven Barks).

JALAPÆ.—Tuber of Exogonium purga, Benth. (Jalap). *Dose*, from 15 to 20 min.

Extractum Fluidum—

Juglandis.—Bark of the root of Juglans cinerea L. (Butternut.)

Juniperi.—Fruit of Juniperus communis L.

Kava.—Root of Piper methysticum, Forster (Kava; Kava kava; Ava).

Lappæ.—Root of Lappa officinalis, Alb. (Burdock).

Malti.—(Fluid Extract of Malt.)

Menyanthis.—Leaves of Menyanthes trifoliata L. (Buck bean.—Trifolium fibrinum, Germ. Ph.).

Petroselini Radicis.—Root of Petroselinum sativum, Hoffman (Parsley).

Phytolaccæ.—Root of Phytolacca decandra L. (Pok Root). *Dose*, from 10 to 30 min.

Quillaiæ.—Bark of Quillaia saponaria, Molina (Soap Bark) Seldom used internally.

Rhamni Purshianæ.—Bark of Rhamnus Purshiana, De C (Cascara Sagrada).

Rhei Aromaticum.—A combination of Rhubarb, Cinnamon Cloves and Nutmeg.

Scoparii.—Tops of Sarothamnus Scoparius, Koch (Broom).

Sennæ Deodoratum.—(Aqueous Fluid Extract of Senna. This preparation is free from the objectionable "griping" qualities of the ordinary fluid extract.

Sterculiæ.—Seeds of Sterculia acuminata, R. Brown (Cola or Kola).

Stillingiæ Compositum.—(Stillingia Comp.) Stillingia Corydalis, each 4 ozs.; Iris, Sambucus, Chimaphila, each ozs.; Coriander, Xanthoxylum Berries, each 1 oz.

Trillii.—Rhizome of Trillium erectum L. (Bethroot).

Turneræ.—Leaves of Turnera microphylla, De C. (Damiana).

Urticæ.—Root of Urtica dioica L. (Nettle).

Verbasci.—Leaves (and flowers) of Verbascum Thapsus L. (Mullein).

Verbenæ.—Root of Verbena hastata L. (Vervain).

Viburni Opuli.—Bark of Viburnum Opulus L. (Cramp Bark).

Zeæ.—Stigmatum maydis—Corn Silk—Stigmata of Zea Mays L. (Indian Corn).

Extractum Ferri Pomatum.—Ferri Malas Crudus (Ferrated Extract of Apples, P. Ger.).

EXTRACTUM GLYCYRRHIZÆ DEPURATUM.—Succus Liquiritiæ, P. Ger. (Purified Extract of Licorice). Prepared by extraction from "Stick" Licorice, and should not be confounded with the Pure Extract Licorice, U. S. P., prepared direct from the root, which is far superior.

GLYCERITI—GLYCERITES. N. F.

GLYCERITUM—

ACIDI TANNICI.—Containing Tannic Acid 20 per cent. in Glycerin; practically identical in strength with the Glycerite of U. S. P. of 1870.

BISMUTHI.—Liquor Bismuthi Concentratus (Concentrated Solution of Bismuth). Each fluidrachm contains 16 grains of Citrate of Bismuth and Ammonium. This preparation is a convenient form of Bismuth for combining with other preparations.

BOROGLYCERINI.—Glycerite of Glyceryl Borate (Solution of Boroglyceride). Boric Acid, in powder, 62 parts; Glycerin enough to make 200 parts; representing 50 per cent., by weight, of solid Boroglycerin. A clear, viscid liquid, more readily soluble in, and miscible with other liquids than the solid Boroglycerin

HYDRASTIS.—(Fluid Ext. Golden Seal, aqueous.) This preparation contains no Alcohol, and represents the active principles of the drug, soluble in 50 per cent. Glycerin, minim for grain.

PEPSINI.—(Glycerole of Pepsin.) Each fluidrachm represents 5 grains of Pepsin (N. F.), equivalent to a theoretical digestive strength of 2500 grains of coagulated albumen.

PICIS LIQUIDÆ.—(Tar.) Containing about 5 grains of Tar.

TRAGACANTHÆ.—Containing about 12 per cent. of tragacanth.

Infusum Gentianæ Compositum Fortius.—For preparing Infusum Gentianæ Compositum mix 1 volume of this preparation with 3 volumes of water.

Infusum Rosæ Compositum.—(Compound Infusion of Rose, P. Br.) An infusion of Red Rose in diluted Sulphuric Acid, Sugar and Water.

Decoctum Aloes Compositum.—(Comp'd Decoction of Aloes.) Contains 4 grains of the aqueous extract of aloes and about two drachms of compound tincture of cardamom, with myrrh, saffron, licorice, and potassium carbonate (2 grs.) in each fluid ounce.

Lac Fermentatum.—(Kumyss.) Cow's Milk, fresh, 32 fluid ounces; Yeast, semi-liquid, 60 minims; Sugar, 1 troy ounce. Dissolve the Sugar in the Milk, contained in a strong bottle, add the Yeast, then cork the bottle securely and keep it at a temperature between 23° and 32° C. (75° to 90° F.), for six hours; then transfer it to a cold place.

LINIMENTA—LINIMENTS. N. F.

Linimentum—

Aconiti et Chloroformi.—Tincture of Aconite and Chloroform, each, 2 fl. ozs.; Soap Liniment, 19 fl. ozs.

Ammonii Iodidi.—Iodine, 30 grs.; Oil of Rosemary, Oil o Lavender, each 110 mins.; Camphor, 220 grs.; Water o Ammonia, 1¾ fl. oz.; Alcohol, enough to make 16 fl. ozs. On standing, it becomes colorless.

Iodi.—(Similar to Ph. Br.) Iodine, 900 grs.; Iodide o Potassium, 360 grs.; Glycerin, ½ fl. oz.; Water, 1 fl. oz.; Alcohol, enough to make 16 fl. ozs.

Opii Compositum.—(Canada Liniment.) Tincture of Opium, 1½ fl. oz.; Camphor, 120 grs.; Alcohol, 4 fl. ozs.; Oil o Peppermint, 180 mins.; Water of Ammonia, 6 fl. ozs.; Oil of Turpentine, enough to make 16 fl. ozs.

Saponato Camphoratum.—(Opodeldoc. Solid Opodeldoc.) White Castile Soap, 1½ tr. oz.; Camphor, ½ tr. oz.; Alcohol, 20 fl. ozs.; Oil of Thyme, 30 mins.; Oil o Rosemary, 60 mins.; Water of Ammonia, Fort., 1 fl. oz.

Terebinthinæ Aceticum.—(Linimentum Album. Stokes' Liniment. St. John Long's Liniment.) Oil of Turpentine, 3 fl. ozs.; Fresh Egg, 1; Oil of Lemon, 60 mins.; Acetic Acid, 300 mins.; Rose Water, 2½ fl. ozs.

Tiglii.—(Linimentum Crotonis, P. Br.) Croton Oil, 2 fl. drachms; Oil of Cajuput, 7 fl. drachms; Alcohol, 7 fl. drachms.

Tiglii Compositum.—Croton Oil, 1 fl. oz.; Oil of Sassafras, 1 fl. oz.; Oil of Turpentine, 1 fl. oz.; Oil of Olive, 2 fl. ozs.

Lotio Adstringens.—(Warren's Styptic.) A mixture of Sulphuric Acid, Oil of Turpentine and Alcohol.

Lotio Flava.—(Yellow Wash—Aqua Phagedænica Flava, P. Ger.) Corrosive Chloride of Mercury, 24 grains, in Lime Water, 16 fl. ozs.

Lotio Nigra.—(Black Wash—Aqua Phagedænica Nigra, P. Ger.) Mild Chloride of Mercury, 64 grains, in Lime Water, 16 fl. ozs.

Lotio Plumbi et Opii.—(Lead and Opium Wash.) Acetate of Lead, 120 grains; Tincture of Opium, ½ fl. oz., in Water, 16 fl. ozs. To be shaken when dispensed.

LIQUORES—LIQUORS. N. F.

Liquor—

Acidi Phosphorici Compositus.—("Acid Phosphates.")

Aluminii Acetatis.—(Aluminii Acetici, P. Ger.) Contains 8 per cent. of basic Acetate of Aluminium.

Aluminii Acetico-Tartratis.—Contains about 50 per cent. of dry, so-called Acetico-Tartrate of Aluminium, which may be obtained by evaporating the solution.

Ammonii Acetatis Concentratis.—About four times the strength of the officinal Liquor Ammonii Acetatis. When dispensed, it is suggested that it be diluted with Carbonic Acid Water, or be directed to be diluted with this at the time of administration.

Ammonii Citratis Fortior.—Each fluidrachm contains about 40 grains of Citrate of Ammonium. Liquor Ammonii Citratis (P. Br.) may be prepared from this solution by mixing one vol. of it with four vols. of Water.

Bismuthi.—Each fluidrachm represents 1 grain of Citrate of Bismuth and Ammonium.

Bromi.—(Smith's Solution of Bromine.) Bromine, 20 per cent.; Bromide of Potassium, 10 per cent.; Water.

Calcis Sulphuratæ.—(Solution of Oxysulphuret of Calcium.—Vleminck's Solution, or Lotion.)

Cupri Alkalinus.—(Fehling's Solution.)

I. *The Copper Solution.*

Sulphate of Copper, pure	34.639 gm. or grains	505
Distilled Water, . . enough to make	500 c.c.—fl. ozs.	16

II. *The Alkaline Solution.*

Tartrate of Potassium and Sodium . .	173 gm.—grains	2520
Soda (U. S. P. 1880)	60 gm.—troy ozs.	2
Distilled Water . . enough to make	500 c.c.—fl. ozs.	16

Keep both solutions, separately, in small well-stoppered vials, in a cool and dark place. For use, mix exactly equal volumes of both solutions, by pouring the copper solution into the alkaline solution. Ten c.c. of the mixture prepared by metric weight and measure correspond to 0.05 gm. of glucose. Of the mixture prepared by apothecaries' weight and measure, 210 minims correspond to 1 grain of glucose.

Liquor Electropoiecus.—(Battery Fluid.)

A. *For the Carbon and Zinc Battery.* I. (For ordinary use.)—Bichromate of Potassium, in powder, 6 troy ounces; Sulphuric Acid, commercial, 6 fluidounces; Water, cold, 48 fluidounces. II. (For use with the Galvano-Cautery.)—Bichromate of Sodium, in powder, 6½ troy ounces; Sulphuric Acid, commercial, 14 fluidounces; Water, cold, 48 fluidounces.

Pour the Sulphuric Acid upon the powdered Bichromate and stir the mixture occasionally during one hour. Then slowly add the Water. Bichromate of Sodium is more soluble than the Potassium Salt, and also much cheaper. When it cannot be obtained, the Potassium Salt may be substituted for it, weight for weight.

B. *For the Leclanché Battery.*—Chloride of Ammonium, 6 tr. ozs.; Water, enough to make 20 fl. ozs.; dissolve the salt in the Water.

Liquor—

Extracti Glycyrrhizæ.—Each fluidrachm represents 15 grains of dry Extract of Glycyrrhiza.

Ferri Hypophosphitis.—(Solution of Ferric Hypophosphite). About 6 minims represent 1 grain of Hypophosphite of Iron.

Ferri Iodidi.—Each fluidrachm contains about 15 grains of Iodide of Iron (ferrous). On mixing 1 volume of this Solution of Iodide of Iron with 5 volumes of Syrup, the product will contain about 60 grains of Iodide of Iron (ferrous) in each fluidounce, and will be practically identical with the officinal Syrup of Iodide of Iron.

Ferri Oxysulphatis.—(Oxysulphate of Iron.)

Ferri Protochloridi.—(Solution of Ferrous Chloride.) Each fluidrachm represents about 20 grains of Protochloride of Iron (ferrous chloride).

Hydrargyri et Potassii Iodidi.—(Solution of Iodide of Mercury and Potassium—Channing's Solution.)

Red Iodide of Mercury, 72 grs.; Iodide of Potassium, 56 grs., in Distilled Water, 16 fl. ozs.

Hypophosphitum.—Each fluidrachm contains 2 grains of Hypophosphite of Calcium, 1¼ grains of Hypophosphite of Sodium, and 1 grain of Hypophosphite of Potassium.

Iodi Carbolatus.—(Boulton's Solution. "French Mixture.")—Comp. Tincture of Iodine, 110 mins.; Carbolic Acid, 40 grs.; Glycerin, 2½ fl. ozs., in 16 fl. ozs.

Liquor—

Iodi Causticus.—(Iodine Caustic. Churchill's Iodine Caustic.) Iodine, 1 tr. oz.; Iodide of Potassium, 2 tr. ozs., in Water, 4 fl. ozs.

Magnesii Bromidi.—Each fluidounce contains about 7 grains of Bromide of Magnesium.

Morphinæ Citratis.—Each fluidrachm contains 2 grains of Morphine in the form of citrate.

Morphinæ Hypodermicus.—(Magendie's Solution of Morphine.) 16 grs. Morph. Sulph. to each fl. oz. (See note.[1])

Pancreaticus.—(Pancreatic Solution.) Each fluidrachm represents 1 grain of Pancreatin (N. F.), effectually preserved in glycerin and a little alcohol.

Pepsini Aromaticus.—Each fluidrachm represents 1 grain of Pepsin (N. F.).

Phosphori.—(Thompson's Solution of Phosphorus.) Each fluidrachm contains about $\frac{1}{24}$ grain of Phosphorus, preserved in absolute alcohol and glycerin.

Picis Alkalinis.—(Tar, Alkaline.)

Potassæ Chloratæ.—(Solution of Chlorinated Potassa—Javelle Water.) An effective and popular disinfectant.

Potassii Arseniatis et Bromidi.—(Liquor Arsenii Bromidi—Clemens' Solution.) This Solution contains an amount of Arsenic in combination corresponding to about 1 per cent. of Arsenious Acid.

The title "Solution of Bromide of Arsenic" (Liquor Arsenii Bromidi) which is often applied to Clemens' Solution or similar preparations, is a misnomer, since bromide of arsenic cannot exist, as such, in presence of water, but is split up into hydrobromic and arsenious acid. The proportions of the ingredients, in the formula above given, have been adjusted, as closely as practicable, so as to yield definite compounds, viz: arseniate and bromide of potassium.

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[1] Particular care should be taken in prescribing and dispensing this solution, so that it may not be mistaken for the so-called United States Solution of Morphine (Liquor Morphiæ Sulphatis, U. S. P. 1870), containing only 1 grain of Sulphate of Morphine in each fluidounce, which is still used in some parts of this country.

The development of fungoid growths or micro-organisms in this and similar solutions used hypodermically may be prevented, or at least greatly retarded, by using Chloroform Water instead of plain Distilled Water as a solvent. This, however, to be done only with the knowledge, or by the direction, of the physician.

Another efficient method to preserve such solutions is, to sprinkle a little Benzoic Acid on the surface of the absorbent cotton through which the solutions are filtered. Or, about 5 grains of Boric Acid may be added to each fluidounce.

Liquor Saccharini.—(Solution of Saccharin.) Each fluidrachm represents 4 grains of Saccharin.

Saccharin is "anhydro-ortho-sulphamine-benzoic acid," an artificially prepared member of the so-called aromatic series of organic chemicals. It is a body having feebly acid properties, soluble in about 333 parts of water and in 33 parts of alcohol at 15° C. (59° F.). When neutralized by an alkali, it is quite soluble in water.

The Solution of Saccharin is intended to be used for sweetening liquids and solids, when the use of sugar is objectionable, or when a sweet taste is to be imparted to a liquid without increasing its density.

Liquor Seriparus.—(Liquid Rennet.)

If this liquid is to be used merely for curdling milk, without separating the whey as a distinct layer, it should be added to the milk, previously warmed to a temperature of about 35° C. (95° F.), and the mixture should then be set aside undisturbed, until it coagulates. If the whey is to be separated, the Liquid Rennet should be added to the milk while cold, and the mixture heated to about 35° C. (95° F.), but not exceeding 40° C. (104° F.). One part of the liquid should coagulate between 200 and 300 parts of cow's milk.

Liquor Sodii Arseniatis, Pearson.—This Solution contains about $\frac{1}{10}$ per cent. of anhydrous Arseniate of Sodium.

This preparation should not be confounded with the Liquor Sodii Arseniatis of U. S. P., which is ten times stronger than the above. Pearson's Solution is officinal in the French Pharm., under the title Solute d'Arseniate de Soude (or Solution Arsenicale de Pearson).

Liquor—

Sodii Boratis Compositus.—(Dobell's Solution.) Borate of Sodium and Bicarbonate of Sodium, each 120 grs.; Carbolic Acid, 24 grs.; Glycerin, $\frac{1}{2}$ fl. oz., in Water, 16 fl. ozs.

Sodii Carbolatis.—(Phénol Sodique.)—Carbolic Acid, 50 per cent.; Soda, 3 per cent., in Water.

Sodii Citratis.—Saturatio (Potio Riveri, P. Ger.)—Citric Acid, 150 grs.; Bicarbonate of Sodium, 190 grs., in Water, 16 fl. ozs.

Sodii Citro-Tartratis.—(Effervescing Saline-Water.)—Bicarbonate of Sodium, Tartaric Acid, Citric Acid, Syrup and Water, in about the same proportions as in Solution of Citrate of Magnesium, for which it is a cheaper substitute.

Sodii Oleatis.—(Oleate of Sodium.) Intended to be used in the preparation of oleates.

Strychninæ Acetatis.—(Hall's Solution of Strychnine.) Each fluidrachm contains $\frac{1}{8}$ gr. acetate of Strychnine.

The P. B. directs a Liquor Strychninæ Hydrochloratis (with synonym: Liquor Strychninæ) which is much stronger, and should not be confounded with the above preparation. It should never be dispensed unless expressly designated.

Liquor—

Zinci et Ferri Compositus.—(Deodorant Solution.) A combination of Sulphates of Zinc and of Iron, Naphthol, Oil of Thyme and Hypophosphorous Acid, in Water.

Used as a simple deodorant and antiseptic for common domestic use, when it is unnecessary or impracticable to employ more powerful agents.

When a deodorant solution is required for purposes where iron is objectionable, as, for instance, when woven fabrics are to be steeped in it, the following preparation may be employed:

2. Liquor Zinci et Aluminii Compositus, in which the sulphate of iron is replaced by Sulphate of Aluminium.

Zingiberis.—(Soluble Essence of Ginger.) A 25 per cent. preparation of Ginger for flavoring aqueous mixtures.

MISTURÆ—MIXTURES. N. F.

Mistura—

Acaciæ.—(Mixtura Gummosa, P. Ger.)

Acacia, pulv., Sugar, each 1 tr. oz., in Water, 12 fl. ozs. Should be freshly made when wanted for use.

Adstringens et Escharotica.—(Villate's Solution.) Solution of Subacet. Lead, 1½ fl. ozs.; Sulphates of Copper, Zinc, each 1 tr. oz.; Acetic Acid, 13 fl. ozs.

Ammonii Chloridi.—(Mistura Solvens Simplex.) Chloride of Ammonium, Purif. Ext. Glycyrrhiza, each 180 grains, in Water, 16 fl. ozs.

Mistura (or *Mixtura*) *Solvens Stibiata* is prepared by dissolving 2 grs. Tartrate Antimony and Potassium in each pint of Mistura Ammonii Chloridi.

Camphoræ Acida.—(Mistura Antidysenterica—Hope's Mixture.) Nitric Acid, 120 mins.; Tinct. Opium, 80 mins.; in Camphor Water, 16 fl. ozs.

Camphoræ Aromatica.—(Parrish's Camphor Mixture.) Tinct. Lavender Comp., 4 fl. ozs.; Sugar, 240 grs.; in Camphor Water, 16 fl. ozs.

Carminativa.—(Dalby's Carminative.) Carb. Magnes., 1 tr. oz.; Carb. Potass., 20 grs.; Tinct. Opium, 180 mins.; Oils of Caraway, Fennel, Peppermint, each, 4 drops; Syrup, 2½ fl. ozs.; in 16 fl. ozs. Each fluid ounce represents about 1 grain of Opium.

Chloral et Potassii Bromidi Composita.—(Mixture of Chloral and Bromide.) Each fluidrachm contains 15 grs. each of Chloral and Bromide Potassium, and ⅛ gr. each of Exts. Indian Cannabis and Hyoscyamus.

MISTURA CHLOROFORMI ET OPII—(Chloroform Anodyne.)

Chloroform Purif.	2 fl. ozs.	Tinct. Op., Deod.	22 fl. drs.
Oil of Peppermint	16 mins.	Tinct. Capsicum .	1 fl. oz.
Tinct. Ind. Cannab.	2 fl. ozs.	Glycyrrhiza, Purif.	240 grs.
Tinct. Quillaja . .	2 fl. ozs.	Water	½ fl. oz.
Fl. Ext. Bellad. .	128 mins.	Syrup . . . to make	16 ozs.

Each fluidrachm represents 7½ mins. each of Chloroform and Tinct. Indian Cannabis; 3¾ mins. Tinct. Capsicum; 1 min. fl. Ext. Belladonna, and about 1 gr. Opium.

This preparation is intended to fulfil the same purposes as the *Tinctura Chloroformi et Morphinæ* P. Br., though the composition of the latter differs materially from the above.

MISTURA CONTRA DIARRHŒAM—(1. Cholera Mixture.)

Tinctures of Opium, Capsicum, Rhubarb and Spirit of Camphor and Peppermint, each, equal volumes.

The above formula appears to be that in most general use, also known under the name of "Sun Mixture."

Of other similar preparations, in more or less general use, the following may be mentioned here:

2. LOOMIS' DIARRHŒA MIXTURE.

Tincture Opium .	½ fl. oz.	Tinct. Catechu Comp.	½ fl. oz.
Tincture Rhubarb .	½ fl. oz.	Oil of Sassafras . .	20 mins.
Tincture Lavender Comp.		to make	4 fl. ozs.

3. SQUIBB'S DIARRHŒA MIXTURE.

Tincture Opium .	1 fl. oz.	Spirit of Camphor .	1 fl. oz.
Tincture Capsicum	1 fl. oz.	Purif. Chloroform	180 mins.
Alcohol		enough to make	5 fl. ozs.

4. THIELEMANN'S MIXTURE—(Mixt. Thielemanni, P. Suec.)

Wine Opium . .	1 fl. oz.	Oil Peppermint . .	60 mins.
Tinct. Valerian .	1½ fl. oz.	Fl. Ext. Ipecac . .	15 mins.
Ether	½ fl. oz.	Alcohol, to make .	4 fl. ozs.

5. VELPEAU'S DIARRHŒA MIXTURE.

Tincture Opium, Tincture Catechu Comp., Spirit Camphor, of each, equal volumes.

MISTURA COPAIBÆ COMPOSITA.

1. Lafayette Mixture.

Copaiba	2 fl. ozs.	Spirit Nitr. Ether .	2 fl. ozs.
Tinct. Lavan. Comp.	2 fl. ozs.	Syrup	5 fl. ozs.
Solution Potassa .	½ fl. ozs.	Mucilage Dextrin to	16 fl. ozs.

This mixture should be well agitated when used.

Each fluidrachm contains 7½ minims of Copaiba.

2. Chapman's Mixture.

Copaiba . . .	1½ fl. ozs.	Spirit Nitros Ether	1½ fl. ozs.
Tinct. Lav. Comp.	136 mins.	Acacia, Sugar, each	180 grs.
Tincture Opium .	180 mins.	Water, to make	16 fl. ozs.

Mistura Expectorans, Stokes—(Stokes' Expectorant.)

Ammonium Carb. .	128 grs.	Tinct. Opii Camph.	3 fl. ozs.
Fl. Ext. Senega .	½ fl. oz.	Water	1½ fl. ozs.
Fl. Ext. Squill . .	½ fl. oz.	Syrup Tolu, to make	16 fl. ozs.

Mistura—

Guaiaci—(Guaiac Mixture, P. Br.) Resin Guaiac, Sugar, each, 190 grs.; Acacia, powder, 100 grs.; Cinnamon Water, 16 fl. ozs. To be well agitated when used.

Oleo-Balsamica.—(Balsamum Vitæ Hoffmanni, P. Ger.) A solution of Oils of Lavender, Thyme, Lemon, Mace, Orange Flowers, Cloves, Cinnamon and Balsam Peru in Alcohol.

Olei Picis.—(Tar Mixture.) A mixture of Oil of Tar, ½ fl. oz.; Chloroform, 75 mins.; Oil of Peppermint, 20 mins., in Elixir, to make 16 fl. ozs.

Rhei Composita.—(Squibb's Rhubarb Mixture.) Fl. Ext. Rhubarb, 128 mins.; Fl. Ext. Ipecac, 25 mins.; Sodium Bicarb., 256 mins.; Glycerin, 6 fl. ozs., in Peppermint Water, 16 fl. ozs.

Sassafras et Opii—(Mist. Alkalina—Godfrey's Cordial.) A mixture of Oil of Sassafras, Tincture of Opium, and Potass. Carb. in Molasses, Alcohol and Water.

Each fluidrachm contains 2 mins. Tinct. Opium, corresp. to ⅕ gr. Opium.

Sodæ et Menthæ.—(Soda Mint.) Sodium Bicarb., 320 grs.; Spirit Ammonia, 60 mins.; Spearmint Water, 16 fl. ozs.

Splenetica.—(Spleen Mixture.—Gadberry's Mixture.) Sulphate Iron, Sulphate Quinine, Nitric Acid, each, 100 grs.; Nitrate of Potassium, 300 grs. in Water, 16 fl. ozs.

Sulphurica Acida.—(Haller's Acid Elixir, P. Ger.) Sulphuric Acid, 1 part, Alcohol to make 4 parts.

Oxymel Scillæ.—(Oxymel of Squill, P. Br.) A preparation of Honey containing about 5 grains of Squill in each fluidrachm.

OLEATA—OLEATES. N. F.

The following are simply solutions of the alkaloids in Oleic Acid:

Oleatum Aconitinæ—Containing 2 per cent. of crystallized Aconitine (Duquesnel's).

Oleatum Quininæ—Containing 25 per cent. of Quinine (Alkaloid).

Of the Oleates introduced by Dr. J. V. Shoemaker the following have been recognized, but others may also be prepared as desired:

Oleatum Plumbi—Containing about 28 per cent. of Oxide of Lead. It is of the consistence and general character of Lead Plaster, and suggests similar use.

Oleatum Zinci.—In the form of a soft, white powder, useful as a "dusting powder," or converted into a plaster or ointment by mixing it with such proportion of Oleic Acid as may be required.

OLEA—OILS. N. F.

Olea Infusa—Infused Oils.

These preparations are obtained by infusing a dry herb, usually from the so-called narcotic plants, in five times its weight of a mixture of equal parts of cottonseed and lard oil. *Oleum Hyoscyami Infusum* is the most familiar example.

Oleum Carbolatum.—A mixture of Cottonseed Oil with 5 per cent. of Carbolic Acid.

Oleum Hyoscyami Compositum.—(Balsamum Tranquillans.) Infused Oil of Hyoscyamus, with a small proportion of each of the Ethereal Oils of absinth, lavender, rose, sage and thyme.

EMPLASTRA—PLASTERS. N. F.

In rolls, to be spread any size, according to prescription, upon leather.

Emplastrum Aromaticum (Spice Plaster)—Consisting of Cloves, Cinnamon and Ginger, each 10 per cent.; Capsicum and Camphor, each 5 per cent.

Emplastrum Fuscum Camphoratum (E. Matris Camphoratum, Ph. Ger.—Camphorated Mother's Plaster). A plaster similar to lead plaster, and containing camphor 1 per cent.

Emplastrum Picis Liquidæ Comp.—A mixture of Resin and Tar, with Podophyllum, Phytolacca and Sanguinaria, of each, 8 per cent.

PEPTONIZING AGENTS. N. F.

Pancreatinum.—(Pancreatin.)

Prepared from the fresh Pancreas of the hog.

Five grains, tested by the method given under Pulvis Pancreaticus Comp., so completely peptonizes 1 pint Milk that, on adding to a small portion of it, transferred to a test-tube, a slight excess of nitric acid, coagulation should not occur.

As peptonized milk is chiefly used as a food for the sick, and as Pancreatin is probably more largely employed for the practical purpose of peptonizing milk, it is imporant to observe the quality of the peptonized product yielded with any specimen of Pancreatin. Peptonized milk, as prepared by the above process, or when the process is allowed to go on to the development of a very distinct bitter flavor, should not have an odor at all suggestive of rancidity. Milk has simply a marked bitter taste when thoroughly peptonized.

Pepsinum.—(Pepsin.)

The digestive principle of the gastric juice, obtained from the mucous membrane of the stomach of the hog, prepared in a dry and undiluted form, and capable of dissolving not less than *five hundred* (500) *times* its own weight of hard-boiled egg-albumen, under the conditions prescribed for the process of assay of the N. F.

Pepsinum Aromaticum.—(Aromatic Pepsin.)

Saccharated Pepsin, with Aromatic Fluid Extract and the addition of a little Tartaric Acid and Chloride of Sodium.

Pepsinum Saccharatum.—(Saccharated Pepsin.)

Corresponds, in strength, to that of the U. S. P.

Pulvis Pancreaticus Compositus.—(Peptonizing Powder.)

Pancreatin (N. F.)	5 grains.
Bicarbonate of Sodium	20 "

The above mixture is sufficient to peptonize 1 pint of fresh cow's milk, by proceeding in the following manner:

Add the Compound Pancreatic Powder to 4 fluid ounces of tepid Water, contained in a suitable flask, and afterwards add 1 pint of fresh cow's Milk, previously heated to 38° C. (100.4° F.). Maintain the mixture at this temperature thirty minutes, then transfer to a cold place.

Milk thus peptonized should not be used when it has been kept over twenty-four hours or when it has developed a bitter taste.

Pulvis Pepsini Compositus.—(Pulvis Digestivus.)

Saccharated Pepsin, 15.; Pancreatin, 15.; Diatase, 1.; Lactic Acid, 1.; Hydrochloric Acid, 2., in Sugar of Milk, 100.

This preparation is intended to replace a proprietary article sold at a fancy price.

Succus Limonis cum Pepsino.—(Each fluidrachm contains 2 grs. of pepsin, N. F.)

Vinum Pepsini.—(Each teaspoonful contains 1 grain of pepsin, N. F.)

PILULÆ—PILLS. N. F.

In stating the quantities of the several ingredients for each single pill, in the formulæ hereinafter given, it was often necessary to choose the nearest simple fraction approximating the true value. When a large number of pills is to be prepared in accordance with the given proportions, and the quantities of the ingredients are to be determined by multiplying with the number of pills required, it is recommended that the nearest whole number, or nearest convenient fraction, in each case, be chosen.

Pilulæ ad Prandium.—(Dinner Pills.)

When "Dinner Pills," under this or some other equivalent name, are prescribed without further specification, the *National Formulary* recommends that the Pilulæ Aloes et Mastiches of the U. S. P., also called Lady Webster's Dinner Pills, be dispensed.

Of other combinations, bearing similar names, or used for similar purposes, the following appears to be those most commonly in use:

Chapman's Dinner Pill.

Aloes	gr. 1½	Ipecac	gr. 1
Mastic	gr. 1½	Oil of Fennel	¼

Cole's Dinner Pill.

Aloes	gr. 1⅕	Tar. Ant. and Potas.,	gr. 1/56
Mass of Mercury	gr. 1⅕	Jalap	gr. 1⅕

Hall's Dinner Pill.

Aloes	gr. 1	Soap, in powder	gr. 1
Ext. of Glycyrrhiza	gr. 1	Molasses	gr. 1

Pil. Aloes et Podophylli Compositæ.—(Janeway's Pills.)

Aloes	gr. 1	Ext. Bellad. Alc.	gr. ¼
Resin Podophyllum	gr. ½	Ext. Nux Vomica	gr. ¼

Pil. Aloini Compositæ.

Aloin	gr. ½	Extract of Belladonna	gr. ¼
Resin Podophyllum	gr. ⅛		

Pil. Aloini, Strychninæ et Belladonnæ.

Aloin	gr. ⅕	Alcoholic Extract of Belladonna	gr. ⅛
Strychnine, alkaloid	gr. 1/120		

PIL. ALOINI, STRYCHNINÆ ET BELLADONNÆ COMPOSITÆ.

Aloin	gr. $\frac{1}{5}$	Strychnine, alkaloid,	gr. $\frac{1}{120}$
Ext. Bellad. Alc.	gr. $\frac{1}{8}$	Ext. Rham. Pursh.,	gr. $\frac{1}{2}$

PIL. ANTIDYSPEPTICÆ.

Strychnine, alkaloid	gr. $\frac{1}{40}$	Mass of Mercury	gr. 2
Ipecac	gr. $\frac{1}{10}$	Compound Extract of Colocynth	gr. 2
Ext. Bella. Alc.	gr. $\frac{1}{4}$		

PIL. ANTINEURALGICÆ.

1. *Gross's Antineuralgic Pills.*

Sulphate of Quinine	gr. 2	Arsenious Acid	gr. $\frac{1}{20}$
Sulphate of Morphine	gr. $\frac{1}{20}$	Ex. Aconite Leaves (U. S. P. 1870)	gr. $\frac{1}{2}$
Strychnine, alkaloid	gr. $\frac{1}{30}$		

When "Antineuralgic Pills," or "Neuralgia Pills," without other specifications, are prescribed, it is recommended that the above preparation be dispensed. Sometimes the Sulphate of Morphine is directed to be omitted when it is so ordered.

2. *Brown-Séquard's Antineuralgic (or Neuralgia) Pills.*

Extracts of Hyoscyamus and Conium, each			gr. $\frac{2}{5}$
Extracts of Ignatia and Opium, each			gr. $\frac{1}{5}$
Ext. Aconite Leaves	gr. $\frac{1}{3}$	Ext. Indian Cannabis	gr. $\frac{1}{4}$
Ext. Stramonium	gr. $\frac{1}{8}$	Ext. Bellad. Alc.	gr. $\frac{1}{6}$

PIL. ANTIPERIODICÆ.—(Warburg's Pills.)

1. *With Aloes:*

Aqueous Extract of Aloes	gr. 1
Rhubarb	gr. $\frac{1}{2}$
Elecampane, Saffron, Fennel, each	gr. $\frac{1}{4}$
Zedoary, Cubebs, Myrrh, White Agaric, Camphor, each	gr. $\frac{1}{8}$
Sulphate of Quinine	gr. $1\frac{3}{5}$
Extract of Gentian	a sufficient quantity.

2. *Without Aloes:* The same formula as above, with the omission of the Aqueous Extract of Aloes. These pills have been introduced for the purpose of facilitating the administration of Warburg's Tincture in a solid form. When "Warburg's Pills," or "Pills of Warburg's Tincture" are prescribed, without further specification, those containing Aloes are recommended to be dispensed. Those without Aloes only when they are expressly demanded.

Each Warburg's Pill represents about 1 fluidrachm of Warburg's Tincture (see Tinctura Antiperiodica).

PIL. CATHARTICÆ VEGETABILES.—(Imp. Vegetable Cathartic.)

Compound Extract of Colocynth	gr. 1
Resin of Podophyllum, Ext. Leptandra, each	gr. ¼
Abstract Jalap, Exts. Hyoscyamus and Gentian, each	gr. ½
Oil of Peppermint	min. ⅛

Extract of Leptandra (U. S. P.) is preferable to the so-called Leptandrin, or Resin of Leptandra, as this is of very uncertain and varying composition.

PIL. COLOCYNTHIDIS COMPOSITÆ.—(Pilulæ Cochia.)

Extract of Colocynth	gr. ⅙
Aloes, Resin of Scammony, each	gr. 2
Oil of Cloves	min. ¼

PIL. COLOCYNTHIDIS ET HYOSCYAMI.

Extract of Colocynth	gr. $\frac{1}{10}$
Aloes, Resin of Scammony, Ext. Hyoscyamus, each	gr. 1½
Oil of Cloves	min. ⅛

PIL. COLOCYNTHIDIS ET PODOPHYLLI.

Compound Extract of Colocynth	grs. 2½
Resin of Podophyllum	gr. ¼

PIL. FERRI CARBONATIS.—(Ferruginous—Blaud's Pills.)

Sulphate of Iron, in clear crystals	grs. 240
Carbonate of Potassium	grs. 140
Sugar	grs. 48
Tragacanth, in fine powder	grs. 16
Glycerin	mins. 10
Water	a sufficient quantity.

Make a mass according to the directions in the *National Formulary*, and divide into ninety-six (96) pills.

Each pill represents about 1 grain of ferrous carbonate.

"Three-grain" Blaud's Pills (Pilulæ Blaudii minores) when prescribed are recommended to be prepared by dividing the above mass into one hundred and sixty-eight (168) pills.

PIL. GLONOINI.—(Nitroglycerin.)

Spirit of Glonoin (N. F., 1 per cent.)	grs. 200
Althæa, in fine powder	grs. 198
Confection of Rose	a sufficient quantity.

Make a mass (according to N. F.) and divide it into two hundred (200) pills.

Each pill contains $\frac{1}{100}$ grain of Glonoin (Nitroglycerin).

PIL. LAXATIVÆ POST PARTUM.—(Barker's.)

Compound Extract of Colocynth . . . . grs. $1\frac{1}{3}$
Aloes . . . . . . gr. $\frac{4}{5}$ Res. Podoph., Ipec., ea. gr. $\frac{1}{12}$
Ext. Nux Vomica . gr. $\frac{1}{12}$ Ext. Hyoscyamus . gr. $1\frac{1}{4}$

This is the formula generally employed by Dr. Fordyce Barker, except where special circumstances render modifications necessary. The formula usually quoted in manufacturers' lists and some formularies is not correct.

PIL. METALLORUM.—(Metallorum Amaræ.)

Reduced Iron and Sulphate of Quinine, of each . . . gr. 1
Strychnine and Arsenious Acid, of each . . . . . . gr. $\frac{1}{20}$

Aitken's Tonic Pill is a similar combination:

Reduced Iron . . gr. $\frac{2}{3}$ Strychnine, Arsenious
Sulphate of Quinine gr. 1 Acid, each . . . gr.

PIL. OPII ET CAMPHORÆ.

Powdered Opium . gr. 1 Camphor . . . . grs. 2

PIL. OPII ET PLUMBI.

Powdered Opium and Acetate of Lead, of each . . . gr. 1

PIL. PODOPHYLLI, BELLADONNÆ ET CAPSICI.—(Squibb's Podophyllum Pills.)

Resin Podophyllum gr. $\frac{1}{4}$ Capsicum . . . . gr. $\frac{1}{2}$
Ext. Bellad. Alc. . gr. $\frac{1}{8}$ Sugar of Milk . . gr. 1
Acacia, Glycerin and Syrup, each . . . a sufficient quantity.

PIL. QUATUOR.—(Ferri et Quininæ Compositæ.)

Sulphate of Iron, Sulphate of Quinine, Aloes, each . gr. 1
Ext. Nux Vomica . gr. $\frac{1}{4}$ Ext. Gentian . sufficient.

PIL. TRIPLICES.—(Triplex.)

Aloes . . . . . . grs. 2 Resin Podophyllum gr. $\frac{1}{4}$
Mass of Mercury . gr. 1

When Pilula Triplex, under this name or some equivalent, is presented without further specification, the N. F. recommends that the above preparation be dispensed. A formula devised by Dr. John W. Francis is also in use:

Francis's Triplex Pill.

Aloes, Scammony, Mass of Mercury, of each . . . . gr $\frac{1}{2}$
Croton Oil . . . min. $\frac{1}{20}$ Oil of Caraway . . gr. $\frac{1}{4}$
Tinctures of Aloes and Myrrh . . . . a sufficient quantity.

PULVERES—POWDERS. N. F.

PULVIS—

ACACIÆ COMPOSITUS.—(Pulvis Gummosus, P. Ger.)

ALOES ET CANELLÆ.—(Hiera Picra.)

AMYGDALÆ COMPOSITUS.—(Almonds Comp.) A mixture of Sweet Almond, Sugar and Acacia, in fine powder. 820 grs. triturated with Water, yields about 16 fluidounces of Mistura Amygdalæ.

ANTICATARRHALIS.—(Catarrh Snuff.) Hydrochlorate of Morphine, 1 part; Acacia, 60 parts, and Subnitrate of Bismuth, 180 parts, in fine powder.

CATECHU COMPOSITUS.—(Compound Powder of Catechu, P. Br.) Catechu, 4 parts; Kino, 2 parts; Krameria, 2 parts; Cinnamon, 1 part, and Nutmeg, 1 part.

CRETÆ AROMATICUS.—A mixture of Cinnamon, Saffron, Nutmeg, Cloves, Cardamom. prepared Chalk and Sugar.

CRETÆ AROMATICUS CUM OPIO.—Aromatic Powder of Chalk, with 1 grain of powdered Opium, in 40 grains of the mixture. Officinal in the Brit. Pharm.

HYDRARGYRI CHLORIDI MITIS ET JALAPÆ.—(Calomel and Jalap.) A mixture of Mild Chloride of Mercury, 10 grains, and Jalap, 20 grains.

When "Calomel and Jalap" is prescribed for an adult, without any specification of quantities, the N. F. recommends that the above mixture be dispensed as one dose.

IODOFORMI DILUTUS.—(Iodoform and Naphthalin.) A mixture of Iodoform, 2 parts; Boric Acid, 3 parts; Naphthalin, 5 parts, with Oil of Bergamot, in fine powder.

This powder is used in many cases where a diluted preparation of Iodoform, for external purposes, is desired. The odor is masked both by the Oil of Bergamot and by the Naphthalin.

KINO COMPOSITUS.—A mixture of Kino and Cinnamon, with 1 grain of Powdered Opium in each 20 grains.

MYRCIÆ COMPOSITUS.—(Composition Powder.) A mixture of Bayberry, Ginger, Capsicum and Cloves.

RHEI ET MAGNESIÆ ANISATUS.—(Compound Anise Powder.) A mixture of Rhubarb, Heavy Magnesia and Oil of Anise.

TALCI SALICYLICUS.—(Salicylated Powder of Talcum.) A mixture of Talcum, with 3 per cent. Salicylic Acid and 10 per cent. Boric Acid, in fine powder.

SALTS—EFFERVESCENT (GRANULAR). N. F.

Ninety grains represent about the quantity of these Salts contained in a heaped teaspoonful of ordinary size.

CAFFEINÆ CITRAS EFFERVESCENS.
Ninety grains represent 1 grain Caffeine.

FERRI ET QUININÆ CITRAS EFFERVESCENS.
Ninety grains represent 1 grain Citrate of Iron and Quinine.

FERRI PHOSPHAS EFFERVESCENS.
Ninety grains represent 2 grains Phosphate of Iron.

POTASSII BROMIDUM EFFERVESCENS.
Ninety grains represent 20 grains Bromide of Potassium.

POTASSII BROMIDUM CUM CAFFEINÆ.
Ninety grains represent 10 grains Bromide of Potassium and 1 grain Caffeine.

POTASSII CITRAS EFFERVESCENS.
Ninety grains represent 10 grains Citrate of Potassium.

SAL CAROLINUM FACTITIUM EFFERVESCENS—(Effervescent Carlsbad Salt, artificial).—A solution of about 87 grains in 6 fl. ozs. of Water represents an equal volume of Carlsbad Water (Sprudel).

SAL KISSINGENSE FACTITIUM EFFERVESCENS—(Effervescent Kissingen Salt, artific.).—A solution of about 80 grains in 6 fl. ozs. represents an equal volume of Kissingen Water (Rakoczy).

SAL VICHYANUM FACTITIUM EFFERVESCENS—(Effervescent Vichy Salt, artific.).—A solution of about 57 grains in 6 fl. ozs. of Water represents an equal volume of Vichy Water (Grand Grille).

SALTS—NON-EFFERVESCENT (FOR MAKING THE ABOVE). N. F.

SAL CAROLINUM FACTITIUM.—In two forms: Dry (Pharm. Ger.) and Crystalline. A solution of about 16 grains of the Dry (20 of the Crystalline) in 6 fl. ozs. of Water represents an equal volume of Carlsbad Water (Sprudel).

SAL KISSINGENSE FACTITIUM.—A solution of about 24 grains in 6 fl. ozs. of Water represents an equal volume of Kissengen Water (Rakoczy).

SAL VICHYANUM FACTITIUM.—A solution of about 14 grains in 7 fl. ozs. of Water represents an equal volume of Vichy Water (Grand Grille).

SPIRITUS—SPIRITS. N. F.

Spiritus—

Acidi Formici.—(Spirit of Ants, P. Ger.) A solution of 3 per cent. of Formic Acid, in Water and Alcohol.

Amygdalæ Amaræ.—(Bitter Almond Essence.)

Aromaticus.—(Aromatic Spirit.)

Aurantii Compositus.—(Orange Compound.)

Cardamomi Compositus.—(Cardamom Compound.)

Curassao.—(Spirit of Curacao.) For Elixir Curacao.

Glonoini.—(Solution of Nitroglycerin.) A solution of Glonoin (or Nitroglycerin) in officinal Alcohol, containing one (1) per cent., by weight, of the former.

Glonoin (or Nitroglycerin), for medicinal purposes, is usually procured in the form of a 10 per cent. solution in alcohol. Such a solution is non-explosive, and may be diluted, as occasion requires, to the strength of 1 per cent. The specific gravity of the 10 per cent. solution is 0.863 at 15° C. (59° F.).

Solutions of Glonoin, particularly the stronger (10 per cent.), should always be transported or kept in tin cans, and never in glass or other fragile vessels. Should the container of a Solution of Glonoin be broken, and the contents be soaked up by wood, or packing material, the latter may become dangerously explosive when the alcohol has evaporated.

When handling an alcoholic solution of Glonoin, care should be taken that it be not brought in prolonged or extended contact with the skin, as it is readily absorbed, and will then cause its characteristic physiological effects (distressing headache, nausea, etc.).

Olei Volatilis.—(A General Formula.) 400 min. of any volatile oil, Alcohol, deod., to make 16 fl. ozs.

Ophthalmicus.—(Alcoholic Eye-Wash.) A solution of 10 mins. Oil of Lavender and 30 mins. Oil of Rosemary, in Alcohol, 1 fluid ounce.

Phosphori.—(Tincture of Phosphorus.) Each fluidrachm contains $\frac{1}{12}$ grain of Phosphorus; or, 14.4 minims contain $\frac{1}{50}$ grain of Phosphorus.

This preparation is intended for preparing the Elixir of Phosphorus (see No. 85). It is unsuited for internal administration without corrigents. Care should be taken that it be not confounded with Thompson's Solution of Phosphorus (see Liquor Phosphori).

Saponatus.—(Spirit of Soap.)

Sinapis.—(Spirit of Mustard, P. Ger) A solution of 2½ per cent. of Volatile Oil of Mustard in Alcohol.

SYRUPI—SYRUPS. N. F.

Syrupus—

Acidi Hydriodici Decolor.—Containing 1 per cent. or about 1 min. of Hydriodic Acid to the fluidrachm.

Actææ Compositus.—(Cimicifuga or Black Cohosh.) Containing 2½ grains each of Cimicifuga and Wild Cherry, 1¼ grains Glycyrrhiza and Senega, and ⅝ grain Ipecac in each fluidrachm.

Asari Compositus.—(Canada Snake Root.) Each fluidrachm represents 3½ grains of Asarum.

Calcii Chlorhydrophosphatis.—(Chlorhydrophosphate of Lime.) Each fluidrachm contains 1 grain of Phosphate of Calcium.

Calcii et Sodii Hypophosphitum.—(Hypophosphite of Lime and Soda.) Each fluidrachm contains 2 grains, each, of Hypophosphites of Calcium and of Sodium.

Calcii Hypophosphitis.—(Hypophosphite of Lime.) Each fluidrachm contains 2 grains of Hypophosphite of Calcium.

Calcii Iodidi.—(Iodide of Calcium.) Each fluidrachm contains about 5 grains of Iodide of Calcium.

Calcii Lactophosphatis cum Ferro.—(Lactophosphate of Lime with Iron.) Each fluidrachm contains ½ grain of Lactate of Iron and about ¼ grain of Lactate of Calcium (or about ⅜ grain of so-called Lactophosphate of Calcium).

Chondri Compositus.—(Irish Moss.) Containing 1 grain each of Squill and Senega, 1/16 grain each of Ipecac and Irish Moss and 1⅔ mins. Tincture Opium Camph. to each fluidrachm.

Cinnamomi.—(Cinnamon, P. Ger.) Chiefly used for flavoring.

Coffeæ.—(Coffee.) Containing 15 grains of the choicest Coffee (Java and Mocha) in one fluidrachm, an elegant vehicle for Quinine and addition to nauseous mixtures.

Eriodictyi Aromaticus.—(Yerba Santa—Syrupus Corrigens.) Chiefly intended as a vehicle for disguising the taste of Quinine and other bitter substances.

Ferri Arseniatis.—Each fluidrachm contains about 1/50 grain of Arseniate of Iron (ferric).

Ferri Citro-Iodidi.—(Tasteless Syrup of Iodide of Iron.) Each fluidrachm contains an amount of Iron corresponding to about 3.6 grains of Ferric Iodide. The officinal Syrupus Ferri Iodidi contains about 8 grains of ferrous iodide (protiodide of iron) in each fluidrachm.

Syrupus—

Ferri et Mangani Iodidi.—(Iodide of Iron and Manganese.) Each fluidrachm contains 6 grains of Iodide of Iron (ferrous) and 3 grains of Iodide of Manganese.

Ferri Hypophosphitis.—(Hypophosphite of Iron.) Each fluidrachm contains gr. 1 of Hypophosphite of Iron (ferric).

Ferri Lactophosphatis. — (Lactophosphate of Iron.) Each fluidrachm contains 1 grain of Lactate of Iron, or about 1½ grains of so-called Lactophosphate of Iron.

Ferri Protochloridi.—(Ferrous Chloride.) Each fluidrachm contains about 1 grain of Protochloride of Iron.

Ferri Saccharati Solubilis. — (Soluble Saccharated Iron—Saccharated Oxide of Iron, P. Ger.) One hundred grains, or about 75 minims, represent approximately 1 grain of metallic Iron, or 3 grains of Oxide of Iron.

Glycyrrhizæ.—(Licorice.) Each fluidrachm represents 15 grains of Glycyrrhiza.

Hypophosphitum Compositus.—Each fluidrachm contains 2 grains of Hypophosphite of Calcium; 1 grain, each, of the Hypophosphites of Potassium and Sodium; ⅛ grain, each, of the Hypophosphites of Iron and of Manganese; 1/16 grain of Hydrochlorate of Quinine and 1¼ minims of Tincture of Nux Vomica.

This Syrup should not be confounded with the officinal Syrupus Hypophosphitum (Syrup of the Hypophosphites; Calcium, Sodium and Potassium). It is intended to replace a well-known proprietary article for which it has been found by many physicians a satisfactory substitute. It is uniform in composition, and more stable and elegant than the patent article.

Ipecacuanhæ et Opii.—(Syrup of Dover's Powder.) Each fluidrachm represents 5 grains of Dover's Powder, or ½ grain, each, of Ipecac and Opium.

Mannæ.—(Syrup of Manna, P. Ger.)

Morphinæ Compositus.—A preparation sometimes dispensed as Jackson's Pectoral Syrup, but as differing in essential particulars, the N. F. recommends that this preparation be dispensed only when expressly designated under this title. Each fluidrachm contains ⅛ grain Ipecac, 5 grains Senega, 1 grain Rhubarb and 1/32 grain Morphine with Oil of Sassafras.

Morphinæ Sulphatis.—(Syrup of Morphine.) Each fluidrachm contains ⅛ grain of Sulphate of Morphine.

This preparation is in considerable use in the Southern States. It should, however, never be dispensed unless it is known to be the preparation intended, or designated as that of the National Formulary (N. F.).

Syrupus—

Papaveris (Poppy, P. Br.—Diacodii, P. Ger.) is similar to the preceding, but considerably weaker.

Pectoralis.—(Jackson's Pectoral Syrup.) Each fluidrachm contains $\frac{1}{32}$ grain, each, of Morphine and Oil of Sassafras.

Phosphatum Compositus.—(Chemical Food.) Each fluidrachm contains about 2 grains of Phosphate of Calcium, 1 grain, each, of the Phosphates of Iron and of Ammonium, and smaller quantities of the Phosphates of Potassium and Sodium.

Rhamni Catharticæ.—(Buckthorn Berries—Syrupus Spinæ Cervinæ, P. Ger.)

Rubi Aromaticus.—(Blackberry Aromatic.) A combination of Rubus, Cinnamon, Nutmeg, Cloves and Allspice.

Sanguinariæ.—(Bloodroot.) Each fluidrachm represents nearly 13 grains of Sanguinaria.

Sennæ Aromaticus.—(Senna Aromatic.) Each fluidrachm represents about 7½ grains of Senna, 3 grains of Jalap and 1 grain of Rhubarb, with aromatics.

Sennæ Compositus.—(Senna Compound.) Each fluidrachm represents 8 grains of Senna, 2 grains of Rhubarb and 2 grains of Frangula.

Sodii Hypophosphitis.—Each fluidrachm contains 2 grains of Hypophosphite of Sodium.

Stillingiæ Compositus.—Each fluidrachm represents 15 minims of Compound Fluid Extract of Stillingia.

TINCTURÆ—TINCTURES.

Tinctura—

Aconiti Fleming.—Each fluidrachm represents 40 grains Aconite, being about twice the strength of the officinal Tincture of Aconite. *Dose*, from 1 to 5 minims.

The N. F. recommends that it be discarded for the Fluid Extract (which is stronger in the proportion of 15 to 10).

Amara.—(Bitter Tincture, P. Ger.) Containing 3 grains, each, of Gentian and Centaury; Bitter Orange Peel, 2 grains; Orange Berries and Zedoary, each, 1 grain.

Antacrida.—(Dysmenorrhœa Mixture—Fenner's Guaiac Mixture.) A mixture of Guaiac, Canada Turpentine, Oil of Sassafras, and ⅓ grain Corrosive Chloride of Mercury in each fluidrachm. *Dose*, from 10 to 20 minims.

Antiperiodica.—(Warburg's Tincture.) *With Aloes*—Rhubarb, Angelica seed, of each, grains, 56; Elecam-

TINCTURA—

pane, Saffron, Fennel, of each, grains 28; Aloes (aq. ext.), Gentian, Zedoary, Cubeb, Myrrh, White Agaric, Camphor, of each, grains 14; Sulphate of Quinine, grains 160; Diluted Alcohol, enough to make fl. ozs., 16.

ANTIPERIODICA. — (Warburg's.) The preceding *without Aloes.* Each fluid ounce of either tincture contains 10 grains of Sulphate of Quinine.

AROMATICA.—(Stomachic, P. Ger.) A combination of Cinnamon, Ginger, Galangal, Cloves and Cardamom.

CAPSICI ET MYRRHÆ.—(Hot Drops.) The preparation popularly known as "Number Six."

CINCHONÆ DETANNATÆ. — For admixture with preparations containing Iron. It represents about 10 grains of the active principles of Cinchona Calisaya, in their natural combinations, in each fluidrachm.

COTO.—This preparation contains 7½ grains true Bolivian Bark in each fluidrachm. The Para-Coto, frequently employed, differs considerably from the above.

FERRI CHLORIDI ÆTHEREA. — (Bestucheff's Tincture — Lamott's Drops, P. Ger.) Each fluidrachm represents about ½ grain of Metallic Iron.

FERRI POMATA.—(Ferrated Extract of Apples—Malate of Iron, P. Ger.) Each fluidrachm represents about ⅜ grain of Metallic Iron.

FERRI CITRO-CHLORIDI.—(Tasteless Tincture of Iron.) Practically identical in the strength of Iron, but not Alcohol, with the officinal Tincture Chloride of Iron, containing an amount of Iron equivalent to 7½ grains of Dry Chloride of Iron in each fluidrachm.

A convenient form of Iron for admixture with Tincture of vegetable astringent drugs, such as Gentian and Cinchona, preparations of which, unlike other iron compounds, it does not discolor.

GUAIACI COMPOSITA. — (Dewees's Tincture of Guaiac.) Each fluidrachm represents 7½ grains Guaiac.

IODI, *Churchill.* A solution of 10 grains Iodine in each fluidrachm, with Iodide of Potassium in Alcohol.

Not to be confounded with Churchill's Iodine Caustic (Liquor Iodi Causticus).

IODI DECOLORATA.—(Colorless Tincture Iodine.) The most approved formula for this well-known preparation.

JALAPÆ.—(U. S. P., 1870.) Each fluidrachm represents about 10 grains Jalap.

TINCTURA—

JALAPÆ COMPOSITA.—Each fluidrachm represents 7½ grains Jalap, and about two grains Scammony.

KINO COMPOSITA—

Tinctures Kino, Opium, each	mins.	180
Spirit of Camphor	mins.	130
Oil Cloves	mins.	2½
Aromatic Spirit of Ammonia	mins.	15
Cochineal	grs.	16
Diluted Alcohol . . . . to make fl.	ozs.	4

Each fluidrachm represents ½ grain, each, of Kino and Opium.

PAPAVERIS.—(Poppy.) Each fluidrachm represents 30 grains of Poppy (Capsule).

PECTORALIS.—(Bateman's Pectoral Drops.) A popular mixture of Opium, Catechu, Camphor and Oil of Anise, containing 2½ minims Tincture of Opium (¼ gr. Pulv Opium) in each fluidrachm.

PERSIONIS.—(Cudbear.) Intended as a coloring agent when a bright red tint or color is to be produced, particularly in acid liquids.

PERSIONIS COMPOSITA.—A mixture of Cudbear and Caramel, intended as a coloring agent when a brownish-red tint or color is to be produced.

PIMPINELLÆ.—(Pimpinella, P. Ger.) Each fluidrachm represents about 10 grains Pimpinella Root.

QUILLAIÆ.—(Soap Bark.) Each fluidrachm represents 10 grains Quillaia (Bark).

Intended as an addition to mixtures containing substances difficult otherwise to incorporate, such as Chloroform, Oils, Balsams, Resins, etc.

RHEI AQUOSA.—(Rhubarb, Aqueous, P. Ger.) Each fluidrachm represents about 5⅝ grains of Rhubarb, with alkalies, flavored with Cinnamon.

RHEI ET GENTIANÆ.—Each fluidrachm represents 4 grains of Rhubarb and 1 grain of Gentian.

RHEI VINOSA.—(Rhubarb, Vinous, P. Ger.) Each fluidrachm represents about 5 grains Rhubarb, with Bitter Orange and Cardamom, in sweet Sherry Wine.

SAPONIS VIRIDIS COMPOSITA.—A solution of about 15 per cent. of Green Soap and 2 per cent. of Oil of Cade.

STROPHANTHI.—(Strophanthus.) From the seeds of *Strophanthus Kombé*, Oliver, deprived of their comose appen-

TINCTURA—

dage and fixed oil, of the strength and according to the formula of Dr. Frazer, of Edinburgh.

Each fluidrachm represents 3 grains of Strophanthus. *The Dose* is from 2 to 10 minims.

TOLUTANA SOLUBILIS.—(Tolu, Soluble.) A so-called soluble essence of Tolu, for flavoring.

VANILLINI COMPOSITA.—A solution of Vanillin and Coumarin, intended for flavoring.

ZEDOARIÆ AMARA.—(Zedoary Comp.) Similar, but not identical, with the Tinctura Carminativa—Wedelii, etc., formerly officinal in some Continental Pharmacopœias.

Each fluidrachm represents 15 grains of Zedoary, 7½ grains of Aloes, and 3¾ grains, each, of Rhubarb, Gentian, White Agaric and Saffron.

VINA—WINES. N. F.

The Wines, with a few exceptions, are prepared with Sherry Wine, and, in some cases, with the *fortified Wine* (Vinum album fortior, U. S. P.), when a larger proportion of Alcohol is desirable in order better to preserve the preparation.

VINUM AURANTII (FOR FLAVORING).

AURANTII COMPOSITUM—(Elixir Aurantiorum Compositum). A combination of Bitter Orange Peel, Absinthium, Menyanthes, Cascarilla, Cinnamon and Gentian, in Sherry Wine. Useful as a stomachic tonic, in doses of one fluidrachm.

CARNIS—(Beef and Wine). Each fluidrachm represents 2 grains of Extract of Beef.

The Extract of Beef in this and similar preparations is that which is prepared by Liebig's method.

CARNIS ET FERRI—(Beef, Wine and Iron). Each fluidrachm represents 2 grains of Extract of Beef, and 2 mins. Tincture of Citro-Chloride ("Tasteless" Tincture) of Iron.

CARNIS, FERRI ET CINCHONÆ—(Beef, Wine, Iron and Cinchona). Each fluidrachm represents 2 grs. Extract Beef, 2 minims Tincture Citro-Chloride Iron, and small quantities of Cinchona alkaloids, in Angelica Wine.

ERYTHROXYLI—(Coca.) Each fluid ounce represents 30 grains of Erythroxylon Coca, in Claret Wine.

ERYTHROXYLI AROMATICUM—(Coca, Arom.) Each fluid ounce represents 30 grains of Erythroxylon Coca, with Aromatics.

VINUM—

FRAXINI AMERICANÆ—(White Ash). Each fluidrachm represents 30 grains of Fraxinus (bark).

PEPSINI—(Pepsin). Each fluidrachm represents 1 grain of Pepsin (N. F.), equivalent to a digestive strength of 1 in 500 of albumen.

PICIS—(Tar). A saturated solution of Tar, in Sherry Wine.

PRUNI VIRGINIANÆ—(Wild Cherry). Each fluidrachm represents 15 grains of Wild Cherry, in Angelica Wine.

PRUNI VIRGINIANÆ FERRATUM—(Wild Cherry, Ferrated). Each fluidrachm represents 5 minims of Tincture of Citro-Chloride of Iron and 13¾ grains of Wild Cherry, in Angelica Wine.

MISCELLANEOUS CHEMICALS.

Acidum Hypophosphorosum Dilutum—Contains 10 per cent. of absolute Hypophosphorous Acid (H_3PO_2).

Acidum Metaphosphoricum Dilutum—Contains about 10 per cent. of absolute Metaphosphoric Acid.

Whenever Pyrophosphate of Iron (U. S. P.) forms one of the ingredients of a mixture containing Diluted Phosphoric Acid, the officinal tribasic acid is unsuitable, as it produces with the salt a gelatinous precipitate. If a clear mixture is required, the above preparation is to be used in place of the officinal. The same may be done when Phosphate of Iron (U. S. P.) is prescribed, though the precipitate caused by the officinal acid in this case is not as bulky, and under certain conditions may not form at all.

Caffeine Preparations—

CAFFEINÆ CITRAS EFFERVESCENS—(Effervescent Citrate of Caffeine). (A teaspoonful or 90 grains contains one grain of Caffeine). (See Effervescent Salts, page 549.)

CAFFEINÆ SODIO-BENZOAS—(Caffeine Natro-Benzoicum). Contains 50 per cent. each of Caffeine and Benzoate of Sodium. It is soluble in two parts of Water.

CAFFEINÆ SODIO-SALICYLAS—(Sodio-Salicylate of Caffeine). Contains 50 per cent. each Caffeine and Salicylate Sodium, and is soluble in two parts of water.

Iron Compounds—

FERRI HYPOPHOSPHIS—(Ferric Hypophosphite). Soluble in Water when mixed with an equal weight of Citrate of Potassium. See also Liquor Ferri Hypophosphitis.

FERRI ET QUININÆ CITRAS EFFERVESCENS.

FERRI PHOSPHAS EFFERVESCENS.—(See Effervescent.) Other Iron Compounds are chiefly represented in the form of Liquors and Syrups, to which reference may be made.

Potassium Compounds—

Potassii Bromidum Effervescens.

Potassii Bromidum Effervescens cum Caffeinæ.

Potassii Citras Effervescens.

In many Saline Drugs the therapeutic effect is greatly enhanced by solution in a considerable quantity of Water, which, when charged with Carbonic Acid Gas, is also rendered more agreeable as a draught.

The effervescent salts furnish a convenient and effective method of administration of various combinations of remedies. The usual dose is one heaped teaspoonful, representing about 90 grains, dissolved in a wineglassful of Water.

MISCELLANEOUS PREPARATIONS

FOR EXTERNAL USE.

Acetum Aromaticum.—(Aromatic Vinegar.) A combination of fragrant Aromatics (Oils of Lavender, Rosemary, Juniper, Peppermint, Cinnamon, Lemon and Cloves), containing 25 per cent. of Acetic Acid in Alcohol and Water. It is an anti-zymotic, and cooling application.

Acidum Carbolicum Iodatum.—(Phenol Iodatum—Iodized Phenol.) A solution of 20 parts Iodine in Carbolic Acid, 76 parts with 4 parts of Glycerin.

Balsamum Traumaticum.—(Turlington's Balsam — Friar's Balsam.) The officinal Tinctura Benzoini Composita is a simplified preparation intended to replace this compound.

Bismuthi Oxidum Hydratum.—A powder from which a mixture, known as *Cremor Bismuthi* or "Cream of Bismuth," may be readily prepared by triturating 20 parts with 80 parts of Water.

Boroglycerinum.—(Glyceryl Borate—Boroglyceride.)—A soft solid from which the 50 per cent. Solution in Glycerin is prepared. (See Solution of Boroglyceride under Glyceriti.)

Carbasus Carbolata.—(Carbolized Gauze.) This Gauze, when dry, contains 2.5 per cent. of Carbolic Acid.

Carbasus Iodoformata.—(Iodoform Gauze.) Strength to be specified. The usual strength is 10 per cent.

Ceratum Camphoræ Compositum.—(Camphor Ice.) Moulded into small cakes suitable for popular use as an application to excoriated surfaces. It contains very small quantities of Benzoic and Carbolic Acids, and oil of bitter almond.

Chloral Camphoratum.—(Chloral et Camphora.) A solution of equal parts of Chloral Hydrate and Camphor.

Collodions—

Collodium Iodatum.—(Iodized Collodion.) Containing 5 per cent. Iodine in Flexible Collodion.

Collodium Iodoformatum.—(Iodoform Collodion.) Containing 5 per cent. Iodoform in Flexible Collodion.

Collodium Salicylatum Compositum.—(Corn Collodion.) Containing 11 per cent. Salicylic Acid and 2 per cent. Ext. Cannabis Indica in Flexible Collodion.

Collodium Tiglii.—(Croton Oil Collodion.) Containing 10 per cent. Croton Oil in Flexible Collodion.

Gossypium Stypticum.—(Styptic Cotton.)

Iodoformum Aromatisatum.—(Deodorized Iodoform.) Containing 4 per cent. of Cumarin. (See also Pulv. Iodoformi Dilutus, page 548.)

The odor of Iodoform may also be more or less masked by many essential oils, for instance, those of peppermint, cloves, cinnamon, citronella, bergamot, sassafras, eucalyptus, etc. Another efficient covering agent is ground roasted coffee. The odor of Iodoform may be removed from the hands or any utensil which it has come in contact with, by washing with an aqueous solution of tannic acid.

Sapo Viridis.—(Green Soap.) A soft soap made by saponifying Cotton Seed Oil with Potassa. The refined oil yields a product of yellowish color, which serves the same purpose as that of greenish tint.

Soda cum Calce.—(London Paste.) Equal parts of Soda and Lime.

Sodii Boro-Benzoas.—(Boro-Benzoate of Sodium.) A mixture of 3 parts Borate of Sodium and 4 parts of Benzoate of Sodium, in fine powder.

Spongia Compressa.—(Sponge Tent.) The N. F. recommends that Sponge prepared for this purpose be preserved with twine wrapped around it. If the twine be removed, care should be observed to protect the Sponge against damp air.

Spongia Decolorata.—Sponge bleached with potassium permanganate.

UNGUENTA—OINTMENTS. N. F.

Unguentum Calaminæ.—(Unguentum Zinci Carbonatis Impuri.—Turner's Cerate.) Containing 17 per cent. Carbonate of Zinc (Imp.).

Unguentum Camphoræ. — (Unguentum Camphoratum.) Containing about 20 per cent. Camphor

Unguentum Fuscum. — (Unguentum Matris. — Mother's Salve.) Containing 50 per cent. of Camphorated Brown Plaster (N. F.).

UNGUENTUM PICIS COMPOSITUM.—(Tar, Comp.) Containing Oil of Tar, 4 per cent.; Tincture of Benzoin, 2 per cent.; and Oxide of Zinc, 3 per cent.

UNGUENTUM SULPHURIS COMPOSITUM.—(Wilkinson's Ointment.—Hebra's Itch Ointment.)

Precipitated Carbonate of Calcium	parts, 10
Sublimed Sulphur, Oil of Cade, of each . .	parts, 15
Green Soap, and Lard, of each	parts, 30

The Lard is mixed with the Green Soap and Oil of Cade; the Sublimated Sulphur and Precipitated Carbonate of Calcium are then gradually incorporated.

MISCELLANEOUS.

Intended chiefly as stock preparations and general Formulas in dispensing.

Liquor Carmini.—(Solution of Carmine.) A neutral solution of Carmine in Glycerin and Water (1 troy ounce to the pint).

Liquor Coccineus.—(Cochineal Color.) An alkaline glycerol of Cochineal similar to that of the Am. Phar. Assoc.

Mucilago Chondri.—(Irish Moss.) Two and one-half fluid ounces will emulsify 4 fluid ounces of Oil. Upon evaporation from glass plates the "scales" resulting constitute the Gelatinum Chondri, N. F.

Mucilago Dextrini.—(Dextrin Mucilage.) A 25 per cent. solution of Dextrin. Two and one-half fluid ounces emulsify 4 fluid ounces of Oil.

Mucilago Salep.—(Salep Mucilage.)—To be prepared *extempore*.

Oleosacchara.—Oil Sugars.—(ELÆOSACCHARA, P. GER.)

Any Volatile Oil	1 drop.
Sugar	30 grains.

Triturate to a fine powder when wanted for use.

Oleosacchara Anisi, Fœniculi, Menthæ pip., or of other aromatic drugs, are prepared from the corresponding essential oils according to this formula.

Species Emollientes.—(Emollient Cataplasm, P. Ger.) A mixture of Althæa Leaves, Mallow Leaves, Melilot Tops, Matricaria and Flaxseed, equal parts of each.

Species Laxantes.—(St. Germain Tea, P. Ger.) A mixture of Senna, Elder Flowers, Fennel, Anise and Bitartrate of Potassium.

Species Pectorales.—(Breast Tea, P. Ger.) A mixture of Althæa, Coltsfoot, Glycyrrhiza, Anise, Mullein Flowers and Orris Root.

Infusum pectorale (Pectoral Infusion, or Infusion of Pectoral Species) is made by infusing 1 troy ounce of the above in the usual manner, so as to obtain 10 fluid ounces of strained product.

Talcum Purificatum.—(Purified Talc.)

Tincturæ Æthereæ.—(Ethereal Tinctures.) The drug properly comminuted, tr. ozs., 2; stronger Ether, 1 vol.; Alcohol 2 vols., enough to make fl. ozs. 16.

A General Formula for the preparation of Ethereal Tinctures of Belladonna, Castor, Digitalis, Lobelia, Valerian or other drugs.

Gelatinum Chondri.—(For making Mucilage of Chondrus.)

WEIGHTS AND MEASURES.

APOTHECARIES' WEIGHTS AND MEASURES.

One Pound,	**℔**	=	**12 Ounces**	=	**5,760 Grains.**
One Ounce,	**℥**	=	**8 Drachms**	=	**480 Grains.**
One Drachm,	**ʒ**	=	**3 Scruples**	=	**60 Grains.**
One Scruple,	**℈**		. . . . .	=	**20 Grains.**
One Grain,	**gr.**		. . . . .	=	**1 Grain.**
One Gallon,	**C**	=	**8 Pints**	=	**61,440 Minims.**
One Pint,	**O**	=	**16 Fluidounces**	=	**7,680 Minims.**
One Fluidounce,	**f℥**	=	**8 Fluidrachms**	=	**480 Minims.**
One Fluidrachm,	**fʒ**		. . . . .	=	**60 Minims.**
One Minim,	**♏**		. . . . .	=	**1 Minim.**

Note.—In prescribing, the troyounce, drachm, and grain, or the fluidounce, drachm, and minim, only should be used.

RELATION OF WEIGHTS AND MEASURES OF THE U. S. PHARMACOPŒIA TO EACH OTHER.

In distilled water at the temperature of 60°.

One Pound	=	0.7900031 Pint	=	6,067.2238 Minims.
One Ounce	=	1.0533376 Fluidounces	=	505.6019 Minims.
One Drachm	=	1.0533376 Fluidrachms	=	63.2002 Minims.
One Scruple		. . . .	=	21.0667 Minims.
One Grain		. . . .	=	1.0533 Minims.
One Gallon	=	10.1265427 Pounds	=	58,328.8862 Grains.
One Pint	=	1.2658178 Pounds	=	7,291.1107 Grains.
One Fluidounce	=	0.9493633 Ounce	=	455.6944 Grains.
One Fluidrachm	=	0.9493633 Drachm	=	56.9618 Grains.
One Minim		. . . .	=	0.9493 Grains.

RELATION OF MEASURES OF THE U. S. PHARMACOPŒIA TO CUBIC MEASURE.

One Gallon	=	231.	Cubic Inches.
One Pint	=	28.875	Cubic Inches.
One Fluidounce	=	1.80468	Cubic Inches.
One Fluidrachm	=	0.22558	Cubic Inch.
One Minim	=	0.00375	Cubic Inch.

WEIGHTS AND MEASURES OF THE METRIC SYSTEM.

MEASURES OF LENGTH.

One Myriametre = 10,000 Metres.
One Kilometre = 1,000 Metres.
One Hectometre = 100 Metres.
One Decametre = 10 Metres.
One METRE = the ten-millionth part of a quarter of the meridian of the earth.
One Decimetre = the tenth part of one Metre, or 0.1 Metre.
One Centimetre = the hundredth part of one Metre, or 0.01 Metre.
One Millimetre = the thousandth part of one Meter, or 0.001 Metre.

(A metre is equal to 39.37 inches; a centimetre to $\frac{4}{10}$ of an inch; and a millimetre to $\frac{1}{25}$ of an inch.

WEIGHTS.

One Myriagramme = 10,000 Grammes.
One Kilogramme = 1,000 Grammes.
One Hectogramme = 100 Grammes.
One Decagramme = 10 Grammes.
One GRAMME = the weight of a cubic centimetre of water at 4° C.
One Decigramme = the tenth part of one Gramme, or 0.1 Gramme.
One Centigramme = the hundredth part of one Gramme, or 0.01 Gramme.
One Milligramme = the thousandth part of one Gramme, or 0.001 Gramme.

MEASURES OF CAPACITY.

One Myrialitre = 10 cubic Metres, or the measure of 10 Milliers of Water.
One Kilolitre = 1 cubic Metre, or the measure of 1 Millier of Water.
One Hectolitre = 100 cubic Decimetres, or the measure of 1 Quintal of Water.
One Decalitre = 10 cubic Decimetres, or the measure of 1 Myriagramme of Water.
One LITRE = 1 cubic Decimetre, or the measure of 1 Kilogramme of Water.
One Decilitre = 100 cubic Centimetres, or the measure of 1 Hectogramme of Water.
One Centilitre = 10 cubic Centimetres, or the measure of 1 Decigramme of Water.
One Millilitre = 1 cubic Centimetre, or the measure of 1 Gramme of Water.

RELATION OF METRICAL WEIGHTS TO WEIGHTS OF THE U. S. PHARMACOPŒIA.

Metrical weights.	Exact equivalents in grains.	Approximate equivalents in grains.	Metrical weights.	Exact equivalents in grains.	Approximate equivalents Troy weight.
Milligrammes.			**Grammes.**		
1 =	.0154	1/65	1 =	15.434	gr. xv.
2 =	.0308	1/32	2 =	30.868	ʒss.
3 =	.0463	1/22	3 =	46.302	℈ij.
4 =	.0617	1/16	4 =	61.736	ʒj.
5 =	.0771	1/13	5 =	77.170	℈iv.
6 =	.0926	1/11	6 =	92.604	ʒiss.
7 =	.1080	1/9	7 =	108.038	℈vss.
8 =	.1234	1/8	8 =	123.472	ʒij.
9 =	.1389	1/7	9 =	138.906	℈vij.
Centigrammes.			**Decagrammes.**		
1 =	.1543	1/6	1 =	154.340	ʒiiss.
2 =	.3086	1/3	2 =	308.680	ʒv.
3 =	.4630	6/13	3 =	463.020	ʒviiss.
4 =	.6173	7/11	4 =	617.360	ʒx.
5 =	.7717	3/4	5 =	771.701	ʒxiij.
6 =	.9260	9/10	6 =	926.041	ʒxv.
7 =	1.0803	1	7 =	1,080.381	ʒxviiij.
8 =	1.2347	1¼	8 =	1,234.721	ʒxx.
9 =	1.3890	1⅓	9 =	1,389.062	ʒxxiij.
Decigrammes.			**Hectogrammes.**		
1 =	1.543	1½	1 =	1,543.402	℥iij ℈v.
2 =	3.086	3	2 =	3,086.804	℥vj ʒiij.
3 =	4.630	4½	3 =	4,630 206	℥ix ʒv.
4 =	6 173	6	4 =	6,173.609	℔j ʒvij.
5 =	7.717	7½	5 =	7,717.011	℔j ℥iv.
6 =	9.260	9	6 =	9,260.413	℔j ℥vij.
7 =	10.803	11	7 =	10,803.816	℔j ℥x ʒiv.
8 =	12.347	12½	8 =	12,347.218	℔ij ℥j ʒv.
9 =	13.890	14	9 =	13,890.620	℔ij ℥v.
			Kilogramme.		
			1 =	15,434.023	℔ij ℥viij.
			Myriagramme.		
			1 =	154,340.23	℔xxvi. ℥ix ʒiv.

RELATIONS OF WEIGHTS OF THE U. S. PHARMACOPŒIA TO METRICAL WEIGHTS.

Fractions of a grain in grammes.			Grains in equivalent metrical weights.			Drachms, ounces, and pounds in equivalent metrical weights.		
Grain.		Grammes.	Grains.		Grammes.	Drachms.		Grammes.
$\frac{1}{64}$	=	0010	1	=	0648	1	=	3 887
$\frac{1}{60}$	=	0011	2	=	1295	2	=	7 775
$\frac{1}{50}$	=	0013	3	=	1943	3	=	11 66
$\frac{1}{48}$	=	0014	4	=	2591	4	=	15 55
$\frac{1}{40}$	=	0016	5	=	3239	5	=	19 43
$\frac{1}{36}$	=	0018	6	=	3887	6	=	23 32
$\frac{1}{30}$	=	0022	7	=	4535	7	=	27 21
$\frac{1}{25}$	=	0026	8	=	5183			
$\frac{1}{24}$	=	0027	9	=	5831	Ounces.		
$\frac{1}{20}$	=	0032	10	=	6479	1	=	31 103
$\frac{1}{16}$	=	0040	12	=	7775	2	=	62 206
$\frac{1}{15}$	=	0043	15	=	9718	3	=	93 309
$\frac{1}{12}$	=	0054	16	=	1 036	4	=	124 41
$\frac{1}{10}$	=	0065	20	=	1 295	5	=	155 51
$\frac{1}{8}$	=	0081	24	=	1 555	6	=	186 61
$\frac{1}{6}$	=	0108	25	=	1 619	7	=	217 72
$\frac{1}{5}$	=	0130	30	=	1 943	8	=	248 82
$\frac{1}{4}$	=	0162	40	=	2 591	9	=	279 92
$\frac{1}{3}$	=	0236	50	=	3 239	10	=	311 03
$\frac{1}{2}$	=	0324	60	=	3 887	11	=	342 13
						Pounds.		
						1	=	373 24
						2	=	746 49
						3	=	1119 72

RELATION OF MEASURES OF THE U. S. PHARMACOPŒIA TO METRICAL MEASURES.

One Gallon	=	3.785 Litres.
One Pint	=	4.273 Decilitres.
One Fluidounce	=	2.957 Centilitres.
One Fluidrachm	=	3.697 Millilitres.
One Minim	=	0.061 Millitre.

RELATION OF METRICAL MEASURES TO MEASURES OF THE U. S. PHARMACOPŒIA.

One Myrialitre = 2641.9 Gallons.
One Kilolitre = 264.19 “
One Hectolitre = 26.419 “
One Decalitre = 2.641 “
One Litre = 2.113 Pints.
One Decilitre = 3.381 Fluidounces.
One Centilitre = 2.705 Fluidrachms.
One Millilitre = 16.231 Minims.

THE METRIC SYSTEM IN MEDICINE,

For Prescription Writing.

♏j or gr. j equals . . . . . . |06 Gm.
fʒj or ʒj “ . . . . . . 4| “
f℥j or ℥j “ . . . . . . 32| “

The decimal *line* instead of *points* makes errors impossible.

As .06 (Drug) is less than a grain, while 4. and 32. (Vehicle) are more than the drachm and ounce, there is no danger of giving too large doses of strong drugs.

C.C. (cubic centimetres) used for Gms. (Grammes) causes an error of 5 per cent. (excess).

A teaspoonful is usually 5 Gms.; a tablespoonful 20 Gms.

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OR

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